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News that matters. A major breakthrough in copyright-protection encryption throws open the doors for the much-anticipated next step in storage: DVD. Look for the mega-media and the drives to hit shelves any day now; and while we're speaking of much-anticipated technologies, *boot* has discovered that the millions of installed Win95 users will not be able to upgrade to USB peripherals any time soon... unless they buy a new PC.

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PURE PC POWER

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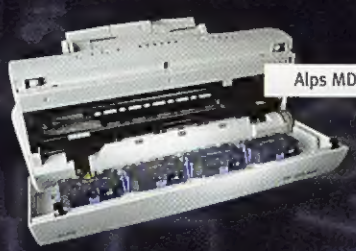

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Making known all new products on the PC horizon.

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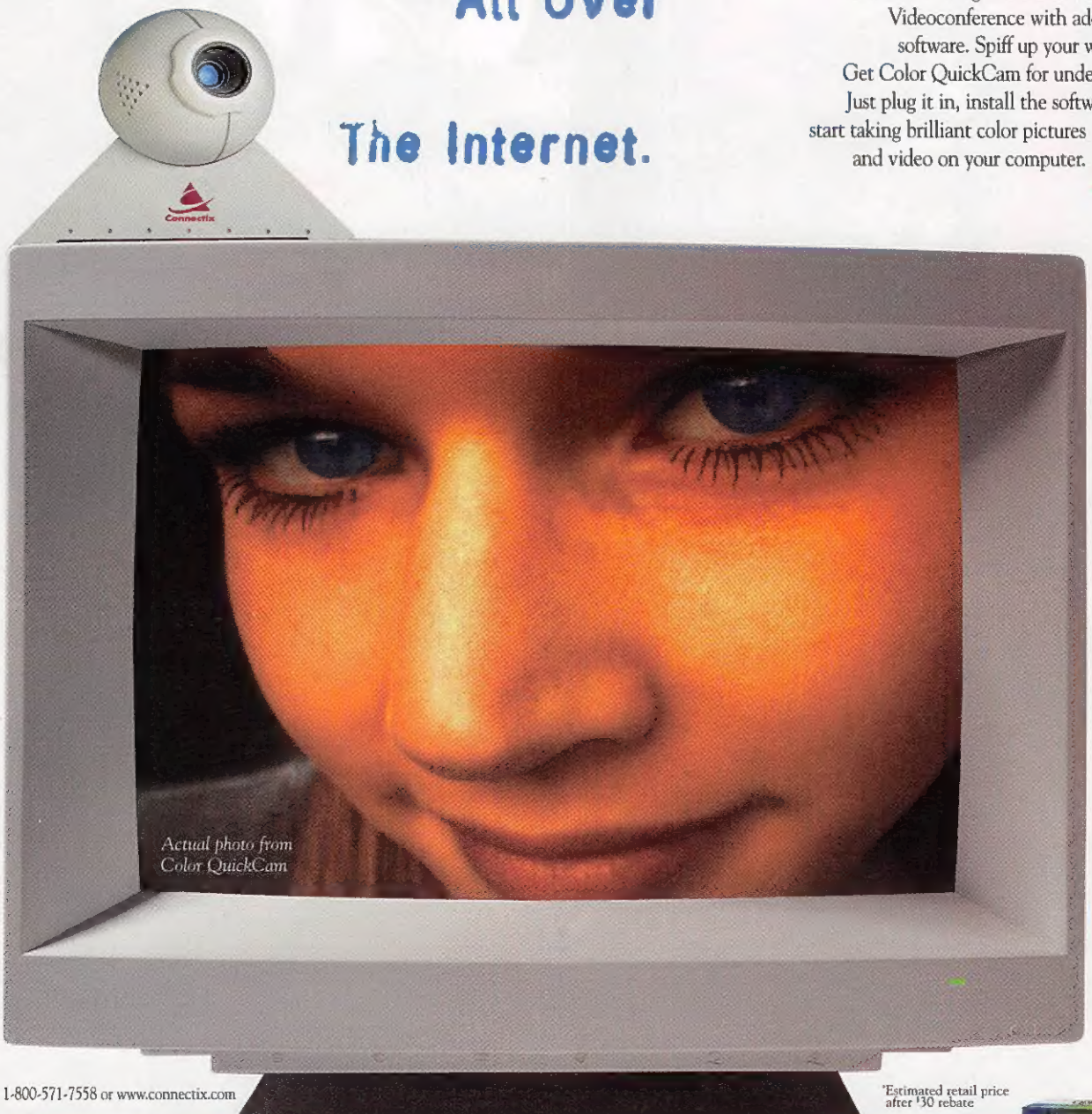

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Image-editing software, such as Adobe's *Photoshop*, allows anyone with a PC, a few scanned images, and some megabytes to burn to meld their world view through a flurry of freaked-out filters. Grand Guru of *Photoshop*, Dan Doerner, reveals his deepest, darkest tips and techniques to make your pictures match your vision, no matter how wild and colorful.

50 The Pure Power Preview '97

In 1996, major hardware manufacturers recognized the home PC owner as a force to be reckoned with. They responded with "ultimate" machines that occasionally lived up to their billing. Brace yourself for 1997 with *boot*'s PURE POWER PREVIEW, a complete rundown of all the tools and technologies that'll rumble your desktop in the coming year.

Lip 32

Microsoft's decision to focus on gaming has impacted all of personal computing The powerful DirectX technologies developed to allow Windows to compete in the game arena promise to change the way PCs look and sound, work and play, and ultimately, interact with one another. The man behind this revolution is the man behind Judgment Day. He is Microsoft's bombastic Game Technology Evangelist,

Alex St. John

boot

january 1997

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EDITOR'S WORDS

Best Served Hot

It seems everyone's starting to realize the same thing: *boot*'s not like all the other PC mags.

Simply flipping through an issue of *boot* reveals the essential differences.

boot isn't for just anyone. We are dedicated to the hardcore PC fanatic, the one who wants the best box possible rumbling on their desktop. *boot* readers want the high-octane components that will translate directly into the benchmarks that leave other machines sitting at the starting line.

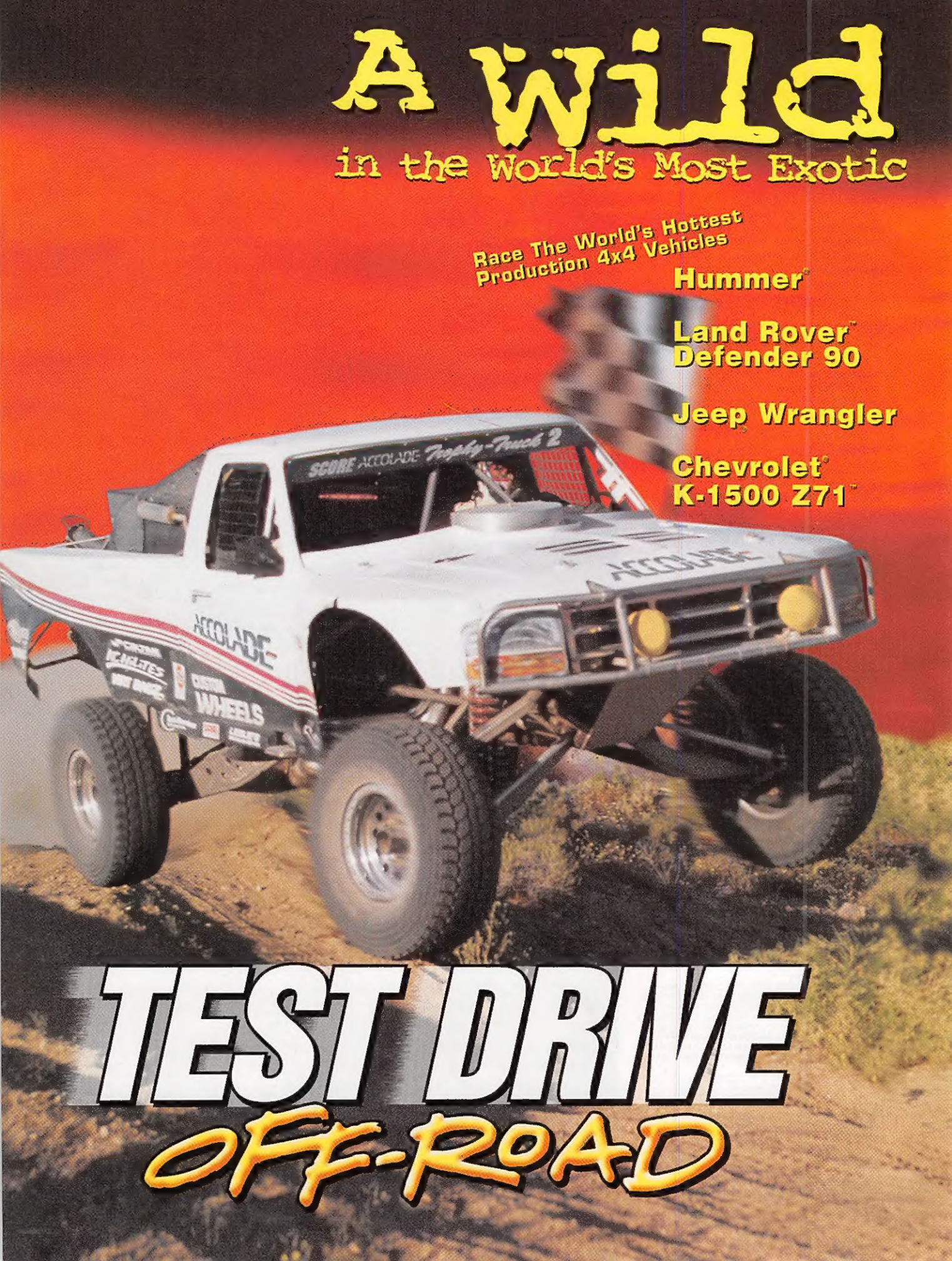
To this end, we made a conscious decision regarding the coverage in *boot*. Instead of wasting your time, and our pages, with vacuous rundowns of every single monitor or modem or whatnot that appears on the shelves of a computer warehouse store, we focus our attention on the good stuff. We call it "the short-list." Yeah, we check it all out, so we absolutely know what's what. But when the ink hits the page (and the HTML hits the WWW), we've done our job: giving you the rundown on the cream of the crop. Our *bootWorthy* department is a great example of this philosophy. Every month we approach a specific category of gear—be it 3D accelerator cards or speakers or monitors—and provide a convenient shopping list for the discerning buyer when it comes time to upgrade. You can rest assured that the short-list we provide won't lead you astray.

When people are trying to understand just what *boot* is about, they invariably ask which other magazines we consider our competition. There's just no pat answer. Nobody else has devoted themselves to you and your ambitious desires. One magazine attempts to be all things to all people, giving up five or 10 pages a month to the coverage that matters to you. Another magazine is content to talk down to the casual PC owner. Some magazines are focused on business issues and applications to the exclusion of all others. At the end of the day, *boot* is the only one delivering 100 percent of your daily PC needs.

Readers are recognizing this and migrating to *boot*. Sure, some are scared away by a magazine that doesn't explain how the CPU is the "brain of the computer" every time it mentions a motherboard. Others take the challenge and step up. Ultimately, this distinction allows us to take our coverage one step further. We look at every component of every system we review. Our editors take it apart and put it back together again, and then drive the beast 'til it either drops or earns our respect. That's part of our secret. Our review labs aren't stocked with technicians in white lab coats, packing clipboards. The *bootLab* is nirvana for anyone who's really got the love for PCs. Our editors roll up their sleeves and get hands-on with the latest and greatest gear, running it through the same paces you'd use your PC for.

Even the PC industry is reading *boot*. We get calls praising our frank and insightful coverage from engineers and product managers at the companies pushing the envelope, and calls damning our honesty from vice presidents of marketing at major manufacturers trying to rest on their laurels. Don't worry. At *boot* we'll always call 'em like we see 'em.

Bottom line: *boot*'s a hotblooded magazine for PC owners who care about high-performance hardware and the software that fuels it. We're unabashed about our feelings: We're stoked about PCs. Today's PCs rip any other digital experience—bar none. And with technologies such as DirectX, DVD, MMX, USB, and FireWire beginning to bust wide open, our jonesing's just gonna get worse. Based on the letters, faxes, e-mail, and psychic memos we've received from you, we know you're hot for the same thing. So keep 'em coming, keep on reading, and we'll keep giving you what we *all* love: Pure PC Power!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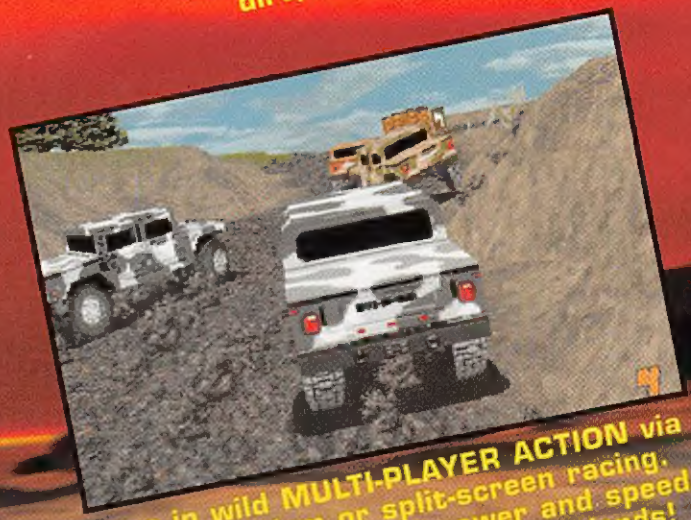

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LETTERS TO THE EDITORS

Kick-Ass magazine

boot Magazine is a definite Kick-Ass product because you guys KICK ASS!!!

Garrett Bartley

Director's cut

bootDisc 02 blew my sorry ass away! I had never previously bought a magazine *only* for the free disc, but when "Macromedia's *Director*" caught my eye (I've been wanting to try it out), I yanked out the eight bucks for your wares.

I have since been booted and rebooted, and now have more demo software installed on my surprised PC than I will be able to handle for quite some time. By the way, you also have a new subscriber.

John Ingram

Letter from an English teacher

When I saw *boot* on the rack at the grocery store, I thought: "Great, another highly visual, content-lacking magazine for Pentium-powered, Win95/NT-running, app-jamming, tech-heads who spend their waking hours concocting 'kewl' ways to express themselves."

I guess I'm not a power user. I run a 486DX 33/66, a 2x CD-ROM, 8MB of RAM, and a 14.4 modem. To beat it all, I have a 14-inch monitor connected to an 8-bit video card. What's my point? Speed does not get me racing. The only time speed comes into play is when I boot. And that's like saying I need an Indy car to drive to work.

I am an English teacher and usually read a magazine in about 45 minutes. With computer magazines, I want items I can *use*, specifically the discs. I make software purchases based on the demo versions found on CD-ROM samplers. The disc is *boot*'s strong point, although the interface is dark and cold, belonging in the gothic movie "Batman Computing."

If you maintain the trend of presenting thematic discs (multimedia, HTML, or whatever) in which I, the non-power using, non-Generation X reader am truly interested, I may do something that no other computer magazine has propelled me to do. I may subscribe.

Joel E. Moyer

Patch it up

I recently bought *boot* 03, and when I tried to run the game *Z* from my computer, it wouldn't work. The demo was looking for a subdirectory on the main directory rather than the subdirectory in the *Z* directory. I was wondering if you were going to post a patch on your web page, because I would really like to try the game out.

On a different note, I really like your magazine, and I am glad I own a computer powerful enough to run the damn disc. It's good to see a magazine catering to the high-end PC market, rather than the "I only have a 486" market. Keep up the good work.

Thanks, and keep the magazines rolling off the press. Millions of readers and I rely on it to keep in touch with the high-end products for the PC.

Marc Poisson

Disc Editor Sean Downey replies: Ask and ye shall receive. A new Z demo is on the bootNet *web site (www.bootnet.com) as I write. Check out the Kick-Ass game, 'cuz it's a blast!*

Don't forget us ladies

I'm impressed with *boot*'s emphasis on new technology and I appreciate the more extensive articles, but it seems that the flavor of the magazine is geared to the male population. For example, "Should we start getting super models to pose for our covers?" (*boot* 02); what exactly is *that* saying to all your female subscribers? And so far all your software reviews have been for twitch games that any 10-year-old kid can master. Where are the reviews for the adventure games where one actually has to think to play? Please don't leave us ladies out in the cold. Believe it or not, there are those of us who are interested in technology and expanding our minds with what's new in the industry.

Holly Short

Editor in Chief Brad Dosland replies: boot *is not geared toward any particular gender.* boot *is geared toward all people with a love for PCs. We cover more than twitchware, recently we've looked at multimedia, utility, and yes, adventure apps. The super model quip was a gag, but still, traditional women's magazines (*Vogue, Cosmo, Women's Home Journal*) all put super models on their covers, as right or wrong as that might be. Obviously* boot *will never do something as superfluous as that. BTW: Does Teri Hatcher qualify as a super model?*

If you are still at a command line, I commend you for standing up to Win95, and you can say what you want.

Macs aren't so bad

Your mag kicks ass, but I have noticed a very sad fact: The readers are way too anti-Mac. I would pick a PC over a Mac any day, but people slam Macs for no reason. Anti-Mac-ers need to learn that all computers have their place. A PC's place is at the top (of course). A Mac's place is in the hands of graphic designer wannabes and other cheap people who can't get an SGI or Sun. If you are still at a command line, I commend you for standing up to Win95, and you can say what you want.

Space Cowboy

Boo... Hiss...

I have now received two copies of *boot* magazine, and all I can say is that I hate it.

In the first two issues, you had NO reviews about any educational software for the younger folks, but instead seem to be focusing on some cult group out there in techno-nerd land...

Don't get me wrong... I am one to adopt new technology first. I have five PCs at home, and some of the latest and greatest gear, but the stuff you are covering is not real-world for most homes.

Caesar Snee

I Want my 3D

First, let me say that I think your magazine is great, especially with regard to reviewing new products. I had been waiting for months for the Compaq Presario 8710/12 to come out. Your magazine's review about the sound card problems was right on target.

In the 'Editor's Words' (*boot* 02), you mention a previous issue's coverage of 200MHz systems with dual 3D accelerators. I didn't see this issue, and I can't seem to retrieve it from your web site. Was there a review of these systems (like the one due out from NEC called PowerPlayer 2020)?

Larry Kurdek

Dual 3D 200MHz monster systems were featured in the premiere issue of boot. *Look under Previous Features on the* bootNet *web site.*

With all this talk about upgrades to 3D sound and 3D graphics, I am feeling behind the times. I currently own a P133, and would like to upgrade my graphics card to a 3D card. However, my graphics chips are mounted directly to my motherboard. Any suggestions for upgrading without changing my motherboard and computer case?

Chris Wolfe

Tech Editor Chris Dunphy replies: Some motherboards with onboard graphics chipsets have jumpers to disable the video and allow an upgrade card. Others (such as the PowerPlayer 2020) detect new graphics cards and automatically disable themselves. You'll have to try it on your machine to know for sure. If it doesn't disable or have jumpers, fire off an angry letter to your computer's manufacturer cursing them for their shortsightedness.

Your preview of future 3D-graphics accelerator cards in *boot* 02 was just what I was looking for. I sent e-mail to Sierra (some of their future software looks hot) and they wrote back saying they like Rendition. Will there be other Rendition cards and will they come with different types of RAM? I'd like 4MB of VRAM or better in my new card.

Thomas A Forland

▶ 11

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Product Information Number 116

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Product Information Number 371

I can't believe *boot* is finally out! The first and second issues really blew me away. You guys know what you're talking about. Please, please, please award a Kick-Ass award to at least one of the 3D accelerators. Which do you think is better?

Kenneth Loo

Senior Editor Mike Brown replies: Sierra likes Rendition because their own Screamin' 3D card is based on the Vérité chipset. Of course, it's one of our current Kick-Ass award winners too (because of its great 2D drivers), along with the Voodoo Graphics cards from Diamond Multimedia (Monster 3D) and Orchid Technology (Righteous 3D). All of these cards use EDO DRAM. If you must have a VRAM-based card, look for our upcoming review of 3D graphics accelerators using the new ViRGE VX chip.

Photo feedback

Mark Madeo's work on the cover of the premiere issue of *boot* is a welcome mix of fantasy and reality. He cleverly combines two seemingly incongruous elements to create a seamless expression. It deserves to be reprinted on an uncluttered page, or even shrunk and used as an ongoing moniker. It seems to accurately depict "the *boot* mission."

Paul Griffith

Editor in Chief Brad Dosland replies: Madeo's work for boot *has been outstanding, particularly the great portraits he's contributed for the Lip interviews. We'll look into the possibility of making a poster out of the premiere issue cover image. (BTW: Kudos to our Art Director Laura Morris for her excellent concept and digital compositing of that striking image.)*

Warp speed

To begin with, let me state that I love *boot*! It is a wonderful mag with a great future.

I would like to reply to Jonathon Woolridge who wrote about OS/2 Merlin. The reason OS/2 Warp is a failure is that it will always be an "also ran" OS because it has to be Windows compatible. Unfortunately it is not Win95 compatible and cannot run the bulk of "Designed for Windows 95" software. It may be a more technically superior OS, but it is not a successful OS.

As for your implication that the only people who like Win95 are a "lesser" breed of user, you are merely numbing the pain of your own ignorance. You made a choice—as did millions of Win95 users—you just made the wrong choice. If you want company, you should look for a GeoWorks users group.

Morgan Nelson

Preguntas para ustedes, gracias

I must say, your magazine is one of the finest available. *boot* kicks it! I receive five computer magazines every month, and I read *boot* cover to cover.

I do however have a couple of questions. I plan to purchase a new computer when MMX and DVD come out. My questions are:
1) Can I run DOS games under NT Workstation?
2) What do you think of OS/2 v.4?
3) Which is faster, a 686 or a Pentium with MMX?

As for your implication that the only people who like Win95 are a "lesser" breed of user, you are merely numbing the pain of your own ignorance. You made a choice—as did millions of Win95 users—you just made the wrong choice.

One of the things that I look at in purchasing a new computer is upgradability, not esoteric looks. If I want to add 16 more megs, I don't want to have to call a tech, or take the system to pieces. Upgradability should be a strong component on your rating system. My current computer has been upgraded three times now.

Josh Javage

Tech Editor Chris Dunphy replies: We do place a strong priority on upgradability. See this month's Pavilion review on page 100 for a graphic example. In answer to your questions:

1) Some DOS games run under NT, but don't get your hopes up. Unless the game touts NT compatibility, dual booting into DOS or Win95 is a better option.

2) OS/2 v.4 is a fine OS, but IBM has ceased development of it. It is a dead end and only viable as a curiosity.

3) We haven't gotten our hands on an MMX system yet, but our guess is that the Pentium MMX will leap ahead of Cyrix 6x86 in performance. Of course, Cyrix has their M2 preparing for liftoff...

Outrageous comment

"He's about as useful to his unit as Bill Clinton would have been to his."

I'm sorry folks, but I can't get the above quote from T. Liam McDonald [Game Theory, *boot* 03] out of my head. Is he saying the president is a coward, or just generally useless? Didn't it occur to anybody that a direct insult to the president of the United States does not belong in a computer gaming magazine?

When Bill Clinton was young he dodged military service. Does this really make him useless or a coward? The war was a relatively small one and did not require the services of all of the men who were available to serve. Were all of the "dodgers" equally useless and/or cowardly? Or does this only apply to Democrats? Or perhaps just to Bill Clinton?

Patrick J. Keating

Editor in Chief Brad Dosland replies: The comment was clearly intended as humor. Comments regarding public personalities, such as the president and Madonna, do belong in boot, *because it is a magazine rooted in the real world.*

Requesting reference

I must say that I love your reviews, The sheer number of them says a lot about your staff. Personally, I am one of the people who spend between $1,000 to $1,500 on their system every year; and I was wondering if it would be possible to list—in a easy reference format—the benchmarks for your various tests (on the *bootDisc*, *bootNet*... wherever.) A reference such as this would make my life much easier when it comes time to upgrade (which seems be all too often—but I need the speed baby!)

Aaron Wilson

Editor in Chief Brad Dosland replies: The sheer number of boot*'s reviews also says a lot about the condition of our staff: exhausted! But the next infusion of cutting-edge goods always seems to perk them up. We are building a benchmark reference library for our* bootNet *web site as I write this.*

Matrox vs. Imagine

Just wanted to take some time to thank the mothers who create this magazine. You guys are the best. When I first saw your mag on the newsstand, I thought to myself and said, "Nice cover, but probably contains the same info as the other 20 mags." I took the chance and purchased it. To my surprise, I fell in love and called for a subscription. Besides lusting for your mag and wishing it was biweekly, I thought the article about how to construct your own powerful PC was great. This article shows that this mag is directed toward the hardware junkies as well as the casual readers. Also I'm about to build my own PC. Tell me which video card to pick: the Matrox Millennium or the Imagine 128.

Jerry Eng

Fantastic! That's what I think about your magazine. I just bought my first issue and I love it. I subscribe to several other magazines, but none of them come close to giving me what I am really looking for. Until now!

What did you do? Take the best people from all the other mags and put them together to create this one?

I have been trying to decide what ▶ 12

commport

LETTERS TO THE EDITORS

kind of video card to buy for several weeks now. After reading your review of the STB Lightspeed 128, I have my answer. You have shown me that it has just what I need.

Steve McCullough

Senior Editor Mike Brown replies: While both are solid cards, we use the Matrox as our reference, based on its high-speed performance in both Windows and DOS. It's a great card for gaming and creative apps.

Guts

I just picked up *boot* 03. It's nice to find a computer mag with some guts. The others would never say "slower then a slug," for fear of losing advertising. Please keep telling it like it is. We don't need another mag full of "everything is wonderful" reviews followed by full-page ads for the product reviewed.

Tom Smith

Advertising Director Angela Mueters replies: Not that we wouldn't accept full-page ads of every product reviewed...

MMX counterpoint

Regarding your article about Intel's delayed MMX chip ("MMX and USB Delayed," *boot* 03), there are a number of important points which need to be addressed:

- Intel is leading consumers to believe that the new MMX Pentium will "do all things for all people." However, Boca Research believes that specialization and discrete components still have their place.
- Performance is compromised when too many functions are bundled onto one chip. While the processing needs for modular functions (video, fax, modem, etc.) have significantly increased during the last three years, the CPU's power has not achieved the same quantum leap processing improvements. Thus, the greater demands of CPU processing, video, wavetable audio, and then transmitting via modem will be too much to simply bundle onto one barely enhanced Pentium.
- Flexibility is also greatly diminished when bundling too many functions on one chip. The adaptability for newer upgrades/versions of specialized functions is handcuffed by a restricted—if not quickly obsolete—function contained in the all-in-one CPU processor.

The ability to purchase a state-of-the-art CPU processor, coupled with the freedom to upgrade "bells-and-whistles" as newer and better adjunct processing techniques continue to come off the production line is the most cost-effective and performance-driven design choice.

Steve Mills
Boca Research Inc.

Conspiracy theories

I loaded *MIE 3.0* from a disc that came with a magazine I bought when I purchased *Navigator 3.0*. I loaded them both. *Navigator* beat *MIE* at getting to any site I tried. (It was from seconds to minutes faster.) But, *MIE 3.0* violated my system, and most of the "Prime Directives" Microsoft has issued to anyone outside of Redmond, Wash. *MIE* stole the bookmarks out of *Navigator*, and then erased them in. *MIE* was very nosy, intrusive, and not as easy to use. When uninstalled, it deleted .dll's that forced me to reload other programs. (Tsk, tsk.) Lastly, there are quite a few suspicious files that *MIE* left behind after the uninstall.

If it has anything to do with Netscape, Microsoft has a monkey wrench, and usually in the back alley from behind.

Rosemary Dugan

Oh come on. Once again you go off bombing *MIE*, with your web site's little "Microsoft's *Internet Explorer* has Buggy Java Script..." tag. Please! Why don't you mention some of *Navigator*'s bugs, such as no ActiveX support, lack of proper HTML 3.0 support, etc. Does someone at *boot* have something against Microsoft or do they have some stock in Netscape? Be fair and do tell about the shortcomings of Netscape too.

William Frisbee

Build to suit

I read in *boot* that the ViewSonic Professional Series P810 monitor was tested with the Number Nine Imagine 128 Series 2 graphics card. I am having a computer built to replace my recently failed one and selected the P810 monitor. I didn't have the P810 in mind when I chose the Diamond Stealth 64 graphics card and was wondering if I should upgrade it to a 128-bit card. Did you run any tests with a 64-bit card, and if so, what performance degradation did you experience?

Dan Brown

Tech Editor Chris Dunphy replies: Excellent choice of monitors—to match it, you really need a graphics card that can do 1280x1024 or, for a real treat, 1600x1200. And make sure you get this with decent color depth and solid refresh rate. Currently, I'm using the Sierra Screamin' 3D with my P810, because I don't want to sacrifice 3D game acceleration; but if I were focusing on 2D only, I would go for a loaded Matrox Millennium or the TwinTurbo-128P from Integrated Micro Solutions. Fully loaded with 8MB, each of these can do 1600x1200 with 24-bit color very nicely.

Rocky Mountain high

Out of all the useless computer garbage in print, I've seen it all. Your magazine is different, perhaps the best computer magazine I've ever seen; with useful stuff and a disc filled with cool demos. Where do you get your information? It's a fresh perspective never perceived before. You guys know your stuff.

I have been reading computer magazines, tech briefs, web pages, etc. for too many years, and I have never seen a $6,000 video card, or even knew they made one. You test stuff that has never been tested, (maybe that's why the magazine costs $8). Anyone who tests their products to the extreme of nearly burning down a parking lot deserves a reward. Thanks! Oh, yeah, where are you guys from? I see some addresses from the state of Colorado, is that where you're based?

Chad Keep

Editor in Chief Brad Dosland replies: Thank you! Actually, our offices are located a stone's throw from Candlestick (né 3COM) Park, just south of San Francisco. Although some of those longballs launched out of Coors Field have landed in our parking lot.

Any magazine stupid enough to pour two gallons of gasoline on a dozen Duraflame logs, expecting to put out the resulting conflagration with a 20 pound fire extinguisher has my vote!

Fire! Fire!

I've enjoyed your magazine since the first issue, but I still wasn't sure I wanted to invest in a subscription, until reading Pure Lust (Fire! Fire!) in *boot* 03. Any magazine stupid enough to pour two gallons of gasoline on a dozen Duraflame logs, expecting to put out the resulting conflagration with a 20 pound fire extinguisher has my vote! I like the content, style, and tone of this rag. My request for a two year subscription has been transmitted to your subscription dept. Keep up the good work.

Larry Burwell

Editor in Chief Brad Dosland replies: Let me set the record straight. I told them one or two logs, (but they sell in boxes of 12). I never mentioned gasoline, (the photographer said it would make the flames look better on film). And a fire extinguisher? Not my idea.

e-mail: commport@bootnet.com
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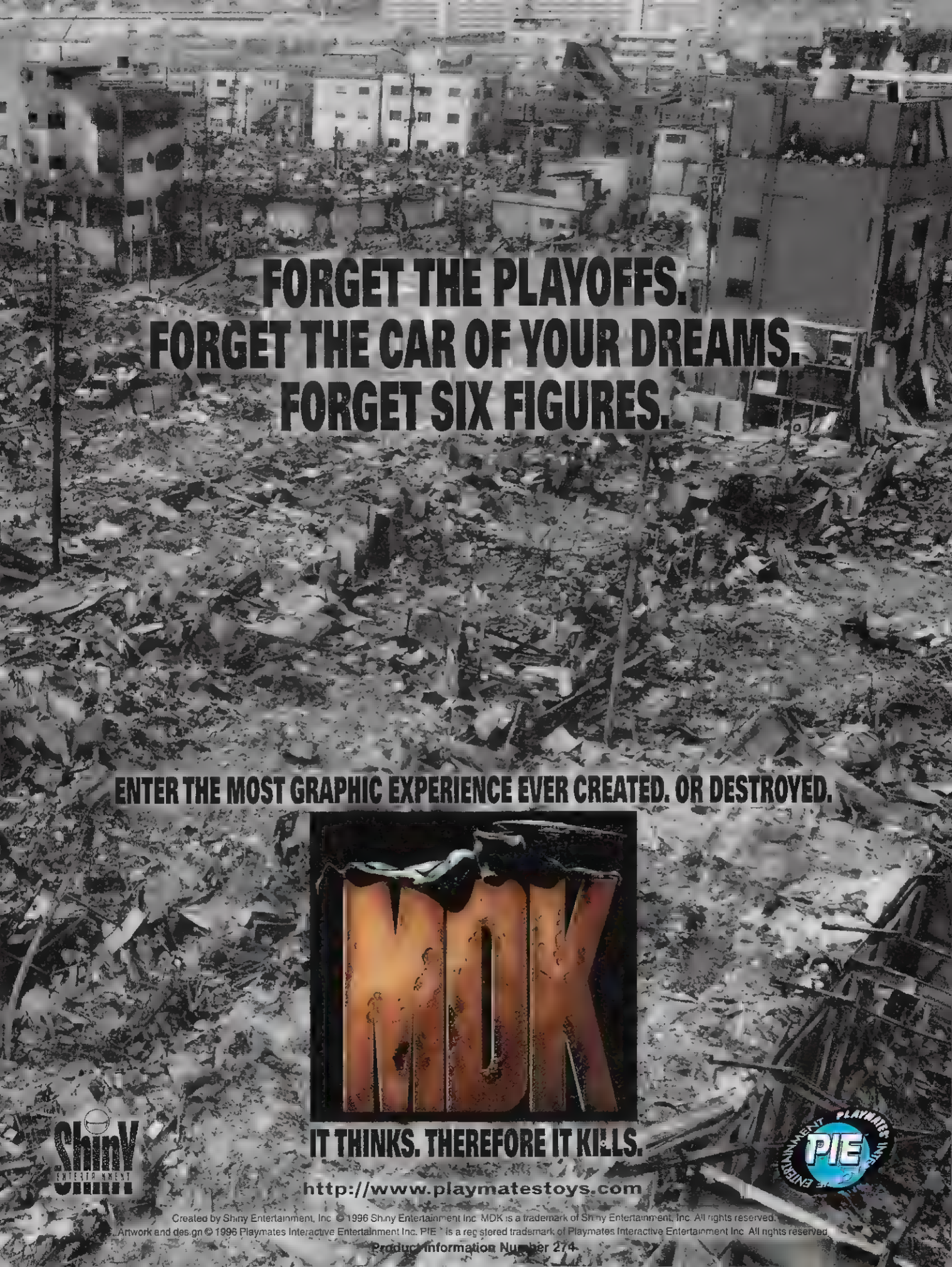

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Product Information Number 274

boot DISC

welcome

to the Fifth Edition of the burly bootDisc!

Every month, ***boot*** magazine delivers 600+MB of exclusive demos, and the hottest software around. If it piques your interest in the magazine look for the ***bootDisc*** logo, and you'll find the fattest demos and coolest apps to complement our cutting-edge previews, reviews, and features.

Slam this ***bootDisc*** into your CD-ROM drive to give yourself an injection of **Pure PC Power.**

Feature: Pure Power Preview

Each of the spinning planets is linked to a hot new technology on the horizon. The Internet Update gives you exclusive access to a special section of ***bootNet*** only available through the ***bootDisc.*** Once you're in, pull down the latest up-to-the-minute news about all the technologies mentioned in the article. Don't worry about browser compatibility—we let you select your preferred browser.

The *bootDisc* is compatible with both Win95 and 3.x. (Simply run boot31.exe to launch the interface under 3.x.) *boot* recommends a Pentium 90 or better with 16MB RAM for access to all the software included.

Demos

We know what you powermongers really want, so we've got huge demos that you can't just download from web site: the hottest games, most innovative apps, and special sneak peeks of things to come. Plus the new streamlined interface allows more intuitive access to the demos.

the web

http://www.bootnet.com

bootNet sports many of the exciting **features** that make ***boot*** magazine such a valuable resource for the hardcore **PC** enthusiast. There are **reviews** and previews, **bootWorthy products**, and an expanding archive of *boot* **articles** from past **issues** online for easy reference, **complete** with a search engine.

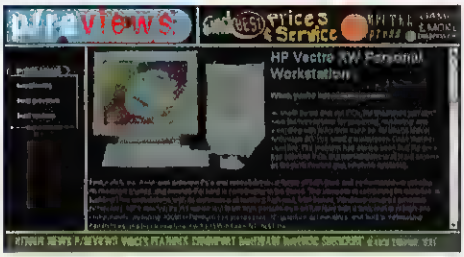
Want a second opinion before plunking down $500 on that snazzy new PDA, or just want to drool over the latest technology that no mere mortal could afford? Come check it out and follow the links for more detailed info!

Of course all this cutting-edge technology comes at a price: You'll need a JavaScript and Frames-capable browser (we recommend Netscape *Navigator* v3.0); a minimum screen resolution of 800x600; and 16-bit color for optimal viewing. The site is graphics intensive, and you'd be wise to view it with something *faster* than a 28.8Kbps modem if at all possible—now's a good time to get that ISDN line.

If you're always climbing to the pinnacle of the fast-paced tech world, you probably have access to these basics; if you're standing still, get your boots on!

NEWS:

bootWire features the latest news; bootDeep gives you in-depth analysis of the key stories broken on the bootWire; and bootRadar picks up the latest cool PC products appearing on the horizon.



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Here you'll find no-bunk reviews and advanced previews of all the PC hardware and software you care about.

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Get your grubby lil' hands on the latest downloadable drivers, patches, and coolest demos around.

VOICES:

Columns by *boot*'s connected writers, a few words from our editor, and some special guest contributions.

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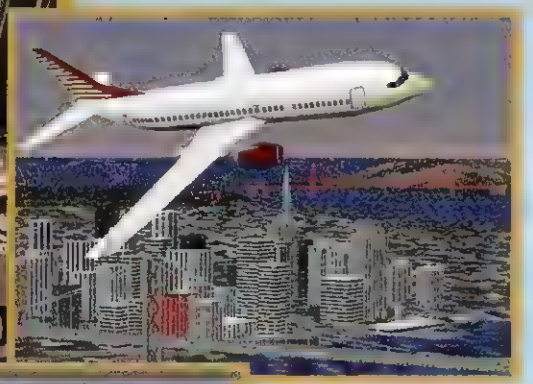
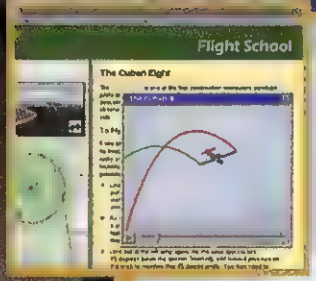
Captain Mathis knows how the love of flight can take hold and make you want to roll your plane, he just feels it's best to save stunt flying for your Extra 300S aerobatics plane.

The sensation of piloting your own aircraft is now attainable in the time it takes to pop in a CD and click a few buttons. The Microsoft® Flight Simulator for Windows® 95 intuitive interface, flying lessons by a virtual pilot instructor, and multimedia demonstrations get you up and flying your first time at the controls. Master flying basics and then, after logging some time, take on some of the more advanced challenges in any of the six planes in your fleet.





You'll soon come to believe that the Golden Gate Bridge was erected just so you could loop around it. Take off from Paris in your commercial Boeing 737-400; instruct your passengers to look out the left side of the plane to see the gardens at the Palace of Versailles. Or take your private Learjet 35A to Vegas; read the marquees on The Strip before landing. Microsoft Flight Simulator for Windows 95 graphics gives you geographical and scenic detail just that vivid (assuming you're not flying into a fog bank).

To view a 60-second sample video of true simulator flight that's as real as it gets, buzz us at www.microsoft.com/games/fltsim/

Microsoft

Where do you want to go today?®

Expansion Pack with southern California scenery, challenges, and adventures available soon.

NUGGETS

Nintendo 64 vs. Commodore 64

Now that Nintendo has finally released and sold out of their long-awaited 64-bit gaming platform, we thought it might be interesting to see how it compares with the other 64 on the block– the Commodore 64.

	C64	N64
INSTALLED BASE	Nearly 30 million C64s and C128s sold.	Less than a million.
SOFTWARE LIBRARY	More than 10,000 titles.	Three to five games.
AVAILABILITY	Check your attic/garage/ closet.	Sold out. You can't buy it.
PRICE	$15 at your local garage sale. Games: six for a dollar.	$199 with no games. Games: $60 or more.
SOUND	Three voice SID chip with built-in sound filters.	Dual digital sound channels. No filters.
GRAPHICS	16 colors, 2D scrolling, raster effects.	Millions of colors. 3D geometry engine.

Clearly, the C64 is the far superior machine. Sure the N64 has a slight edge in graphics and sound, but it's gameplay that *really* makes a system. *Paradroid*, *Archon*, and *M.U.L.E.* as well as thousands of other classics are easily the equal to *Mario*. Better luck next time Nintendo.

Apple Moves Into Black

Sleight of hand can't hide the company's troubled situation

Beleaguered Apple Computer Inc. stunned the world by announcing a profit of $25 million in its most recent quarter. To accomplish this feat, Apple has laid off 900 workers, and will kill off another 600 positions to try and keep the company in the black.

Mere weeks later, Apple announced it was abandoning its next OS, Copland. In a letter to its developer community, Ellen Hancock, Apple's Chief Technical Officer said, "The enhancements that you have asked for, such as the delivery of a new kernel, I/O system, and file system, remain active projects." But closed with a pessimistic, "At this point it's not possible to make statements about delivery schedules of these specific components."

With the announcement, former Apple Chief Technology Officer Jean Louis Gassée's BeOS remains the leading contender to run the Macintosh machines of the future.

Microsoft Continues Quest for World Domination

Software company establishes its own currency

Microsoft has recently begun to issue their own currency: MSDollars. So far, they're the only ones to accept the bills, but if the spread and standardization of DOS and Windows is any indication, the U.S. Government may be in deep trouble.

Panasonic's Close Brush with a Touchy Subject

New products would put the "personal" back into PCs

When Panasonic launched a new line of home PCs with touch-screen capabilities in Japan, it figured a woodpecker would be the perfect mascot for the hunt-and-peck web surfer. So the company spent big bucks promoting the product, which they named "Touch Woody." A bundled utility for downloading home pages was titled "*Internet Pecker*." The day before the product was to be formally announced, an American woman at the electronics giant noticed the double-entendre and alerted management. The name was subsequently changed to "Woody Touch Panel" at the last minute.

Let's Talk About ME!

Straight from the *Let's Talk About ME!* press release: "Finally, the quintessential CD-ROM for girls has arrived! Ever wonder what it's like to pick out your outfits for the week—on your computer? This interactive computer program covers a wide variety of topics from fashion to horoscopes, diaries to dreams, and answers to females' challenges of adolescence." The product will be available from Simon & Schuster.

Netscape Kills Off Navigator

Netscape revealed it intends to dump Netscape *Navigator* in favor of a new product called Netscape *Communicator*. In addition to a core WWW browser, *Communicator* will allow users to share data over networks, conduct audio conferences, and improve e-mail exchange. *Communicator* will also include new tools for web development, group messaging, and real-time collaboration. *Communicator* will be available for $49 and can be downloaded off the web.

Netscape's plans to integrate support for Microsoft's ActiveX in future products, indicate it is finally acknowledging the existence of Microsoft; and Microsoft, for its part, has already announced plans to integrate Java in its suite of products in 1997.

WE KNOW HOW YOU ARE GOING TO DIE

"*The Vanguard of a terrifying new level of immersive technology.*"

—COMPUTER GAMING WORLD

"...by far the most addictive, multiplayer action game we've ever played."

— PC MAGAZINE

"Quake overwhelms the senses."

—USA TODAY

"Quake is the biggest, baddest, bloodiest and most atmospheric 3-D action game ever conceived."

—PC GAMER

"Quake is the most satisfying first-person action game of all time."

— BOOT MAGAZINE

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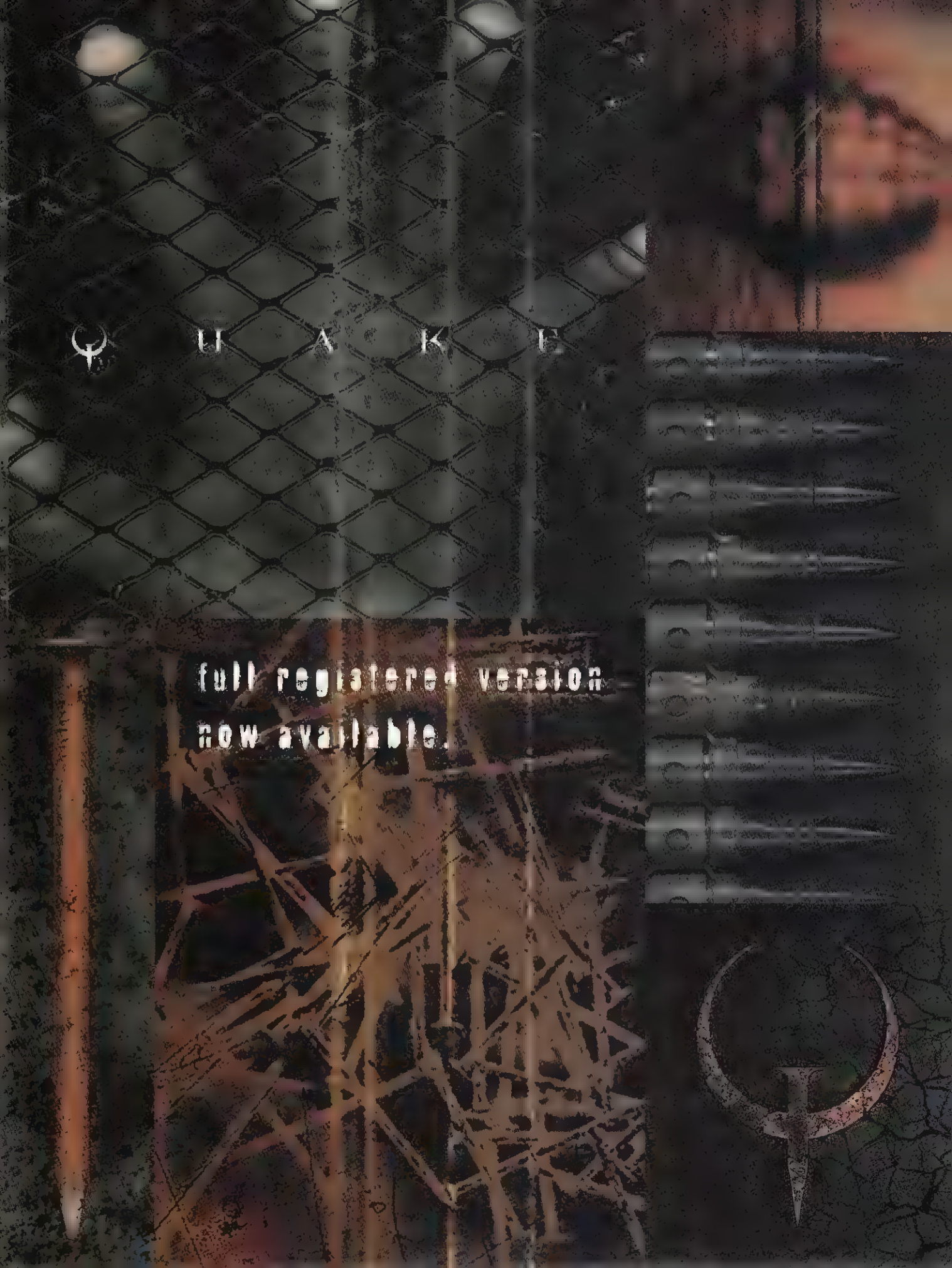
Product Information Number 152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USB Will Not Work With Pre-1997 Versions of Win95

Microsoft will not support universal bus standard until release of Memphis OS in late '97

boot recently discovered that the much-anticipated USB universal peripheral standard will not be compatible with existing versions of Windows 95 (OSR1). An updated version of the OS with USB drivers will be shipping to OEM vendors by the start of 1997, so those machines will support the standard. But anyone who currently owns a PC with USB ports, such as Toshiba's Infinia line, or plans to upgrade with a PCI-based USB card is out of luck until Microsoft ships their next OS, code named Memphis, slated for mid- to late-1997 delivery. We talked to ***Phil Holden****, Product Manager for the Windows Product Team at Microsoft, to find out the whole story.*

boot: What are the advantages of USB?

Holden: From a consumer standpoint, simplicity. You can purchase any piece of hardware with a USB port, and you won't have to do any hardware maintenance to the computer. USB is also fast, and an industry standard.

boot: Is Microsoft planning any USB support for OSR1 consumers?

> The only way to get USB is through purchasing a new machine from one of our OEMs.
> — *Phil Holden, Product Manager*

Holden: No. The only way to get USB is through purchasing a new machine from one of our OEMs.

boot: How do PC owners with OSR1 get upgraded to USB?

Holden: At the moment, they don't. Unfortunately, they'll have to wait until the next major OS release, Memphis, which is expected to go beta in the first quarter of '97. That's when we'll start to make USB devices available in retail.

Phil Holden, Product Manager for Windows at Microsoft says current PC owners will not be able to upgrade to USB until the next major OS release.

boot: So current PC owners won't be able to upgrade to USB until the final release of Memphis?

Holden: Correct. And, to be honest, there aren't a lot of USB devices currently out there. One of the benefits we have in making this available through retail is testing. We need to do a huge amount of broad-based testing on these devices, and there aren't enough devices available right now to do that.

boot: Is Microsoft moving toward one unified operating system?

Holden: We will definitely see a merger of the technologies. For example, NT 4.0 and Win95 now share common technologies. This will continue with the next products, NT 5.0 and Memphis. The complete merger, however, is probably three to four years out.

boot: To that end, Microsoft is phasing out Win95's VXD drivers and will only integrate USB via NT's WDM (Windows Driver Model) drivers. Has the integration of WDM and USB impacted the delivery date of USB in any way?

Holden: No. It was just that our implementation allowed us to build everything once for both devices. The first implementation will be Win95, and the second implementation will be Windows NT, which will be released in the fall of '97. Traditionally, ISVs [independent software vendors] and IHVs [independent hardware vendors] have to write multiple software drivers for their devices, depending on which Windows operating system they want to work on. People that are making hardware components, such as USB peripherals, would prefer to write only one. The concept behind WDM is they can write one software driver for both Win95 and NT. We launched this initiative earlier in the year at our hardware developers' conference, and it got a lot of praise, but we are just starting to deliver software components.

boot: Will hardware manufacturers be able to add value to their product's driver?

Holden: Yes, and that's by extending the class driver. They can build an extension specific to that device. If a class driver, for example, defines 10 functions, and their product happens to support 15, they can extend support for those additional things. These extensions they develop are called Mini Port drivers, and that Mini Port driver is the extra stuff to differentiate them from other vendors in the marketplace.

boot: Where does a peripheral manufacturer who has no experience in USB or the WDM model go for assistance?

Holden: We have all the development tools and guidelines on the web. We also have a number of specific conferences, such as the Professional Development Conference, which are focused on software development. And in April of every year we have WinHec, our hardware development conference, targeted at the hardware companies. There are also support forums on the web, which are manned by our support people and developers.

boot: Does Microsoft offer support for driver development?

Holden: We do, yes.

boot: So you actually have staff for support?

Holden: Yes, very much so. They are a very critical part of our staff. One of the models we continually pursue is to help developers build applications for Windows. It's extremely important for us to help the developer community.

— *Bryan Del Rizzo*

DVD Breakthrough Announced

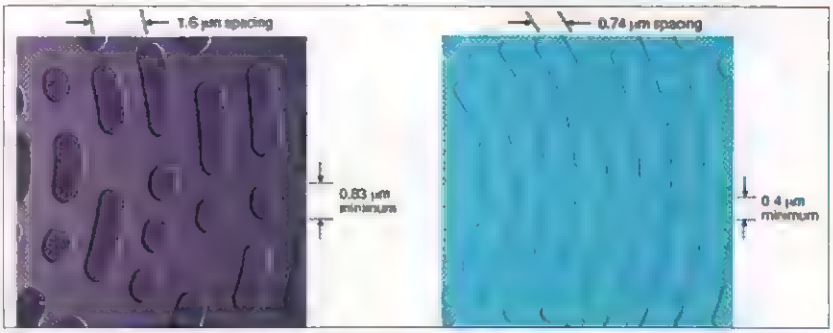
After more than a year of gridlock, the revolutionary storage medium will finally hit store shelves

With astonishing specs (4.7GB storage, 4.69Mbps transfer rates, Dolby AC3 audio, etc.) and a competitive price point (roughly that of today's CD-ROM technology, once commonly implemented), DVD seemed like the promised land for PC users when a unified standard was first introduced back in 1995. Toss in backward compatibility with the burgeoning library of CD-ROM titles available and the medium seemed destined for success.

Then someone had the idea to put movies on the discs and everything fell apart.

The completely digital DVD format can play full-length feature films with a resolution of 720x480 (the same resolution used by Digital Satellite Systems) and delivers color, sound, and clarity surpassing the quality of today's laserdiscs.

The computer industry has had to cope with software piracy since its inception, but the inevitable drag-and-click theft presented a new threat to the movie industry. Duping VCR cassettes was an arduous task and resulted in a copy with degraded quality. Whereas writable digital formats meant fast, easy copying with no loss of quality.



DVD discs look like traditional CDs, (both are silver) and even have the same 4.75-inch diameter dimension. To increase storage capacity, the data on the DVD disc is recorded using smaller pits and a tighter spiral. DVD data can also be recorded on four layers, two on each side of the disc.

This monkey wrench threatened to stop the progress of DVD dead in its tracks, until recently, when the multi-industry Copyright Protection Technical Working Group (CPTWG) announced a scrambling scheme based on encrypting prerecorded movie disc content. The data-scrambling algorithm was initially proposed by the DVD Consortium that initially announced the format. Representatives of Intel and other computer companies were concerned about the impact descrambling would have on computational power. The DVD Consortium implemented a modification proposed by IBM that reduced that burden substantially, without compromising copy protection value.

DVD drives should be hitting shelves now.

IBM's Alan Bell, who co-chairs CPTWG's subcommittee for DVD, says, "Most importantly, it is an effective method that will not undermine consumers' enjoyment of the product."

The optional decryption technology will be licensed from an independent non-profit entity established by the CPTWG, so it seems probable that there will be two distinct varieties of DVD drives: those that can view prerecorded movies and those that cannot.

"Equipment manufacturers who wish to have their machines play encrypted DVD-video will be in a position to get a license to do so," says co-chair Chris Cookson of Warner Brothers.

Assuming the licensing has a strong impact on DVD hardware pricing, many PC owners may opt for DVD drives unable to display commercial movies. But for anyone who dreams of watching *Terminator 2* on their 17-inch monitor, don't despair. A large library of MPEG movies are available on CD-ROM at prices roughly equivalent to prerecorded videotapes.

While a huge faction of Hollywood and Silicon Valley is behind this new emerging standard, (primarily because of its superior performance and low manufacturing costs), not everyone in the software industry is jumping on the bandwagon.

Phil Adam, Vice President of Interplay stated, "At present, we have no titles in development [for the DVD format], but that can all change based on the acceptance, and mass market of this new standard."

> **DVD hardware sales will reach $1.28 billion, with an installed base of seven million units by the year 2000.**
> *— Industry Report, Access Media International*

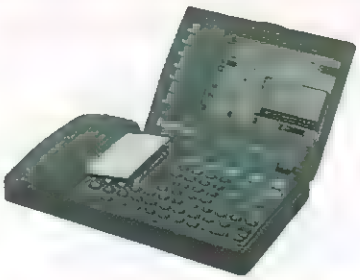
Industry analyst Access Media International projects that a majority of DVD-ROM hardware sales will come from upgrade kits through mid-1997 with sales of $194 million expected in 1997. AMI predicts that DVD-ROM hardware sales will reach $1.28 billion, with an installed base of seven million units by the year 2000.

By the end of the year we'll see more computer manufacturers adopt DVD drives in their new MMX machines. IBM, Compaq, Sony, Toshiba, and NEC are all planning to ship DVD-equipped systems in '97. In November '96, Diamond Multimedia Inc. announced an agreement with Toshiba to deliver the first line of DVD solutions for personal computers. Diamond's DVD drives will feature decoders for MPEG-2 video and Dolby AC-3 digital audio, and are expected to cost between $600 and $1,000.

— Brad Craig

pure lust

HIGH-TECH **TOYS** AND **TOOLS** WITH THE RIGHT STUFF



Let me give you my card

Those plastic business card albums are so... analog. But who's really going to spend time entering 200 people's stats into a database after a big trade show? That's where Panasonic's CF-CR100 NeoFile comes in. The $399.95 unit scans and stores information from up to 500 cards that can then be retrieved by name, title, or any other contact information. Weighing less than a pound, the hardcover book-size NeoFile can easily be stuck in a briefcase when traveling. Once you return to the office, the CF-CAA10 interface (sold separately for $124.95) enables you to download the NeoFile data into *Lotus Organizer* or other PC software applications.

Panasonic: 201.348.9090; www.panasonic.com

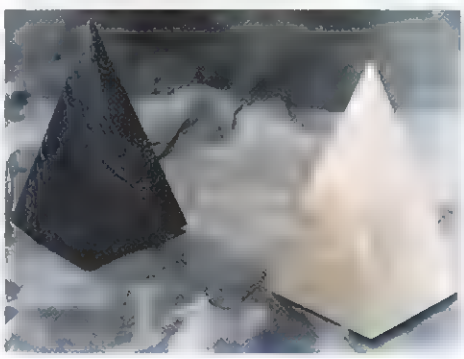
Make your point

The OPTI K laser pointer from Lyte Optronics would impress even Ronald Reagan. The engravable sleek silver aluminum body houses a 4.5 milliwatt laser with two lenses for projecting either a solid red dot, blinking dot, or a continuous straight line so you can underscore with finesse. The pointer even features a low-battery indicator so you know when it's time for a new AAA. With a range of up to 400 yards, the $99 OPTI K is ideal for making big presentations or annoying the people in the next building.

Lyte Optronics: 800.255.9133

!toob daeR

Forget about those subliminal self-help tapes you picked up at the New Age bookstore—who knows what you're really being programmed with. A much better tool for subliminal suggestion is the Power Pyramid. Simply speak your affirmation-of-choice into the Pyramid's microphone and it will be played back 180 times an hour at a volume just below conscious perception. The message can be changed as often as you like and the pyramid even monitors the room's ambient sound to automatically adjust its loudness to the ideal subliminal programming level. More than 100 fun-to-read sample affirmations are provided. (Example: "I am comfortable in an airplane. Airplane travel is the safest way to travel. I am in control of my fears. I am safe in an airplane.") Does the $79.95 Power Pyramid really work? Well, as the instruction manual says, "What hard, scientific proof do we have that prayer works?" Good point.



Slater Technologies Inc.: 702.597.1688

Like to watch?

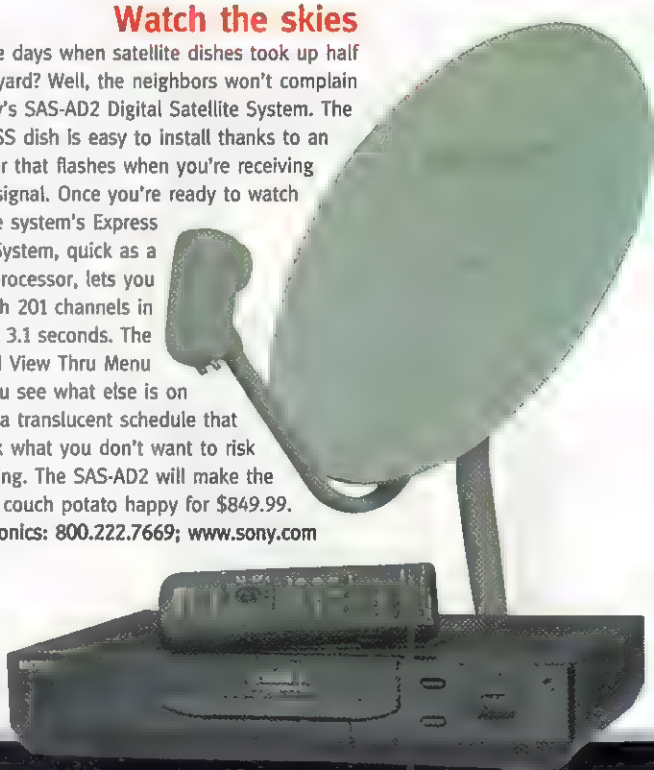
Peeping Toms and wannabe James Bonds take note: The pocket-size Moonlight Mini Scope will give you night vision without weighing you down. Only 5.5 inches long and 8.6 ounces, the $379 scope fits in the palm of your hand and features a built-in infrared illuminator so you can even peer into *completely* dark environments such as caves. You'll be able to see plenty with a focus range of eight feet to infinity, a maximum relative viewing range of 150 feet, and a field of view of at least 37°. Powered by two AAA batteries, the Moonlight Mini Scope comes with a case so you can strap it to your utility belt.

Moonlight Products: 619.525.0300; members.aol.com/nightvis

Watch the skies

Remember the days when satellite dishes took up half your back yard? Well, the neighbors won't complain about Sony's SAS-AD2 Digital Satellite System. The 18-inch DSS dish is easy to install thanks to an LED indicator that flashes when you're receiving the satellite signal. Once you're ready to watch some TV, the system's Express Navigator System, quick as a 32-bit microprocessor, lets you surf through 201 channels in approximately 3.1 seconds. The Enhanced View Thru Menu even lets you see what else is on by showing a translucent schedule that doesn't block what you don't want to risk missing. The SAS-AD2 will make the ultimate couch potato happy for $849.99.

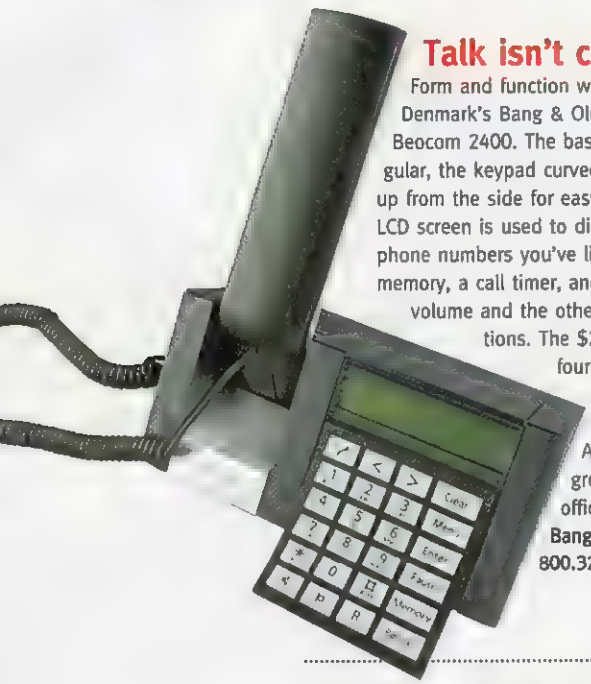
Sony Electronics: 800.222.7669; www.sony.com



compiled by David Pescovitz

I said five more minutes!!!

Snooze-addicts will get a kick out of the Voice Clock, the first travel clock with voice recognition technology. Not only can you set the time, day, date, and alarm simply by speaking, but saying "snooze" when the alarm interrupts your dream shuts the thing up. For $75, the Voice Clock also features an alarm that gets steadily louder, reducing the pain of being woken and a backlit display allows insomniacs to watch the hours tick by. Battery powered and weighing only five ounces, the Voice Clock is perfect for bouncing between time zones.
Voice It Worldwide Inc.: 970.221.1705; www.voiceit.com



Talk isn't cheap

Form and function went hand in hand when Denmark's Bang & Olufsen designed the Beocom 2400. The base of the phone is triangular, the keypad curved, and the handset juts up from the side for easy grabbing. A two-line LCD screen is used to display names and telephone numbers you've listed in the 121-entry memory, a call timer, and menu for controlling volume and the other programmable functions. The $249 unit also features four ringing tones, microphone muting, and a hands-free function. Available in black, blue, green, or red to fit any office, or spaceship decor.
Bang & Olufsen of America: 800.323.0378

Small radio, big sound

This thing is *tiny*! Just a bit bulkier than a Zippo lighter and weighing less than two ounces, Aiwa's CR-A05 AM/FM radio is simple, effective, and almost invisible. With Super Bass for kicking lows, you won't have to limit your listening to tinny tunes either. One AAA battery powers the $49.95 CR-A05 for many hours and the in-ear pipe phones won't mess up your coif. Keep one of these in your pocket at all times for those headache-inducing bus rides or to tune in to the ballgame Secret Service style.
Aiwa America, Inc.: 800.289.2492; www.aiwa.com

Tubeless tube

Making multimedia presentations to a group huddling around a notebook PC is a drag. But if you're ready to invest $8,995, you can have a super bright LCD projector that's directly compatible with your PC (and VCR for those Blockbuster nights). Sharp's XG-E1000U delivers SVGA (800 x 600) resolution signals and uses the company's Super High Aperture technology to project an impressively bright image, even at its maximum screen size of 500 diagonal inches. Weighing in at 33.9 pounds, the XG-E1000U doesn't take your high school A/V crew to lug it around either.
Sharp Electronics: 800.237.4277; www.sharp-usa.com

Set for stun

Afraid to walk to your car at night? The Air Taser is a hand-held non-lethal self-defense system that uses compressed air to launch two wired probes 15 feet and into an attacker's clothing, zapping them with an electrical impulse that jams the nervous system. The result? The attacker's body goes limp for up to 15 minutes. And the new laser sight module makes aiming a no-brainer. With two air cartridges, a nine-volt battery, training video, practice target, and carrying strap, the Air Taser w/Laser Sight Kit sells for $399.95. A small price to pay for peace of mind and body. (Illegal in some states.)
Air Taser Inc.: 800.978.2737; www.airtaser.com

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Microsoft

Where do you want to go today? www.microsoft.com/sidewinder/

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INSATIABLE

HOW MMX AND UNREAL WILL CHANGE THE WORLD

Every leap forward in game technology only has us looking for the next one. We have *Quake* and *Duke Nukem 3D*, so all we can talk about is *Prey* and *Unreal*. We have Pentium 200s, but we'll be grousing because MMX isn't here now. We're not satisfied with what we have, so we must pine after what we can't have; like a schoolboy mooning over a leggy redhead.

Well, if you weren't early adopters, you wouldn't be reading *boot*, would you? So, chances are you've heard of *Unreal* and MMX, but do you know what they mean for 3D graphics, computer environments, and gaming? Read on.

When a new generation of processor hits, it means the technicians at Intel have found a way to squeeze yet more speed from conventional architecture through conventional measures. Clock frequencies are goosed using micro-architecture techniques such as superpipelining, branch prediction, and superscalar execution.

In developing MMX, Intel added some 57 new instructions to the architecture. These new instructions speed up those processor-intensive loops that bog apps down. While they only account for some 10 percent of the coding, these dreaded loops can chew up nearly 90 percent of the processing time.

Intel took a long, hard look at the video, VR, 3D, audio, data compression, and speech recognition applications being developed and discovered certain similarities: they use small integer data types; much of the code runs in parallel; and they require lots of calculations. So Intel created Single Instruction Multiple Data (SIMD) techniques, to enable programs to crunch multiple data elements in parallel. This means that multiple pieces of data can be "worked" with a single instruction.

With a single MMX instruction, up to eight integer pairs can be added together in parallel. The MMX instruction set was specifically designed to take advantage of 16-bit integer math operations. Four integer adds, subtracts, or multiplies can be processed in parallel using MMX technology. In addition, there are instructions provided to perform packed logical operations (such as "and" and "or" statements), arithmetic operations, data conversions to and from the packed data format, and 64-bit data transfers to and from the MMX registers and host memory.

Once SIMD instructions are integrated into existing code, performance in these apps improves up to 400 percent. Developers simply use their own enhanced subroutines or call on MMX drivers and routines through APIs that are currently under development. The result will be more efficient simultaneous processing of multiple functions (such as extensive sound effects, music, 3D graphics, and an Internet connection). As a result, games will be able to use 24-bit true color at 30fps and multiple sound effects. Since it's just more instructions, it also retains complete backward compatibility. The Pentium Pro version of MMX, code named "Klamath," is clocking in at 232MHz and is already ramping up for release.

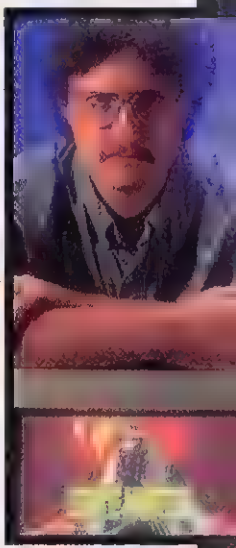
A few developers are coding their new titles to take advantage of this performance boost. Last month *boot* spoke to Fabrice Valay about his racing game *POD*, but the most anticipated application of MMX will be *Unreal*, the *Quake*-killer from Epic MegaGames. Mark Rein, President of Epic MegaGames, says he first learned of MMX while showing *Unreal* to Intel about two years ago: "When they saw what we were doing, they obviously thought it was something that could make use of MMX, because we were using a software-only renderer."

"You'll be involved in the scenes rather than just running through them." — *Mark Rein, President of Epic MegaGames*

The *Unreal* environments are stunning, fully-realized worlds far more elaborate than the dungeons of *Quake* or the cities of *Duke*. Game levels are actual buildings (a castle, a temple, a mine), linked by hills and landscape. About 20 fully-animated monsters populate this world, and you can morph into them. More than just an action game, *Unreal* will have some strong content. And, for a twist, the lead character is a woman.

The benefits of MMX are clear to Rein: "The learning curve for developing for MMX is really small, and the payoffs are big. It's just been a matter of figuring out how to best make use of it. The biggest thing we've been seeing with MMX is the ability to mix colored lights, something computers usually aren't too good at. With MMX we've upped the sound engine to 44KHz. I'm not 100 percent sure what all the final benefits will be, but right now it enables us to do 24-bit color with colored lights at the same frame rates we're getting with 8-bit color."

The major benefit of MMX is the high frame rate at higher resolutions. "That's one of the things that makes *Unreal* different from *Quake*," Rein says. "In *Quake*, you run around and kill everything. But in *Unreal*, since the visuals are so much clearer due to the higher resolution, you spend more time looking around and hunting for things. You'll be involved in the scenes rather than just running through them."



Unreal was written for Win95 from the ground up, so strong native TCP/IP support greatly eased the challenge of developing multiplayer support for the Internet. As Rein observes, "Anyone still writing for DOS has to be foolish."

MMX is not something people are necessarily going to run out and buy the minute it becomes available, but Intel's plans for it are comprehensive, and by 1998 there should be enough MMX machines around to make it an essential market for game developers. And, as Rein says, "Developers who get experience with it now are going to be in a good position later." b

T. LIAM MCDONALD is the all-knowing god of gaming. He also writes about computers, literature, and horror for numerous mags.

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SEVEN SITES A-SAILING

POINTS OF **INTEREST** ON THE **PC SEAS**... PLUS A **PDA** BONUS STOP!

Now that all the holiday hullabaloo is over, we can get on with our busy busy lives. More meetings, more deadlines, and more more more time to surf the web. Yippee! And with more time to surf away the snow/sleet/fog/rain blues (depending on what part of the country your modem is connected to), make sure you get to the required sites. Required? Yes, required. This month I've compiled a list of seven sites you *must* visit weekly, if not daily. Some of them may be familiar, others may not.

Upside

www.upside.com

Upside is ready, willing, and able to guide you through the world of corporate high-tech moguls; tell you where they sleep, who they vote for, what their net worth is, and how long before they go public. It's a print magazine for executives and entrepreneurs, and the online offerings are fabulous. Check out the Editor's Choice section to catch a glimpse of the top 200 public companies, 100 privates, and all-star best executives. Dig through the reader forums to chat about finance, marketing, or recruiting in the silicon surf. Or just wallow in insightful articles about the likes of Andy Grove and other tech honchos.

BugNet

www.bugnet.com

This site's name is nothing shy of endearing. Sift through BugNet for the latest reports about system and software bugs, hacks, glitches, "and their fixes"! Some of the content is free, (such as regularly updated features), but for a fee (ranging from $29 to $150 depending on which services you want) The BugNet Bummer and The New BugNet Alert let you have access to the the BugNet BugMaster database of thousands upon thousands of bugs and how to fix 'em. The link list is super nice too.

PBS History of the Internet

www.pbs.org/internet/history

Telling the tale from the 1960's paranoia about how the U.S. government would communicate after a nuclear war to a 1996 whiz-bang multimedia World Wide webolution, this site kicks axe with great historical information. The pages are well designed, the related links are über-cool, and the timeline is concise enough, yet delightfully complete, to manage in a single sitting. Did you know that the word "Internet" was first used in 1982? Well, I doubt that, but it's a good place to start.

Build Your Own PC

www.verinet.com/pc

Yep. And it's right on. It's ripe and dripping with hardware info-bytes. It has everything, from which components you'll need (motherboards, disk drives, cases, and sound cards) to where to get them (phone numbers, addresses and links, oh my!). What's most impressive is that if the author *doesn't* know enough information about a specific section—which is rare—he bravely asks for reader help, and the readers give it. It's a wonderful creation for any gadget hack.

With 425 links for multimedia applets, 710 links for database and development tool applets, and info about the mother of all applets, the Java Etch A Sketch, you *cannot* go wrong.

Gamelan

www.gamelan.com

If you are hot and heavy on the Java bandwagon and haven't seen this yet, put this magazine down now and log on. Gamelan is an amazing resource for Java applets. With 425 links for multimedia applets, 710 links for database and development tool applets, and info about the mother of all applets, the Java Etch A Sketch, you *cannot* go wrong. There's lots to see and learn, and of course, mucho to play with.

Christine.com

www.christine.com

Still a young site, Christine dot com is *the* hot spot for client/server advice and software development questions. Sponsored by Christine Comaford, a leading software development consultant, this site is packed with tricks of the trade, "cool free stuff" (templates to analyze work flow, consulting issues, power point lectures and studies), and, of course, hundreds of insightful columns. The quickie interview with Mark Andreesen is way cool.

Menuez Digital Art

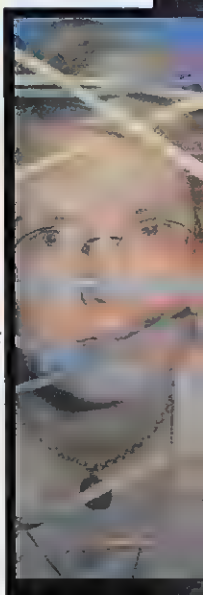
www.menuez.com

A photographer for *Time, Life, Newsweek* et al., Doug Menuez has spent too much of his life since 1987 taking MOMA-quality snapshots of the business and technology world. While most of this site is riddled with Mac and Newton history, you'll find some non-Apple goodies too, such as a snap of Adobe founders Chuck Geschke and John Warnock chuckling, and the ubiquitous Billy Boy Gates. The works are stunning and a refreshing landing spot after you geek out on all the other PC web wonders.

Pilot Mania

http://www.pilot.org/

This is a MUST for anyone suffering from a curious and addictive Pilot (that adorable little PDA from US Robotics) fetish. Sift through miles of Pilot applications (including the 3D Pilot animated logos, *Tetris*, and *Black Jack*); keep tabs on Pilot in the news; read interviews with Pilot and palmtop pioneers; and add your name to a monster list of current Pilot users (so you can exchange mail with others obsessed like yourself). Joking aside, if you ever had a question about your brain-in-a-pocket, go here. It's a great resource.



SHEL KIMEN (kimen@well.com) has spent more time online than is reasonably healthy for one person and dreams in hypertext

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Product Information Number 303

THE J-MAIL DELUGE

AT LONG LAST, A **SOLUTION** FOR THE FINE ART OF **SPAMMING**, ROOTED IN THE VERY SAME **TECHNOLOGY** THAT MADE THIS **ABOMINATION** POSSIBLE

Here are some excerpts from a few messages recently waiting for me in my personal e-mail account:

- "Hello, I want to convince you that we have the BEST PSYCHICS available."
- "Discover how you can manage your own/child's disorder—alternatives to a lifetime of prescribed drug therapy—on the free audiocassette 'GOD's RECIPE.'"
- "Earn $10,000 in the next 30-60 days, $2000+ per week thereafter. All cash business—paid directly to YOU—no waiting for company checks."

Ah, the joys of modern technology. There were 14 of those messages in my e-mail box that day. Plus one letter from a friend, and a gentle reminder from my editor that this column was due.

I call this stuff "j-mail": junk e-mail. Most net users call it "spam," but I see no reason to cast aspersions on a perfectly good processed food product that has staved off hunger for millions of students and bachelors. "J-mail" is a much more clever term (coined by Arlan Levitan in the early 1980s). Yes, there was j-mail even in those ancient days of 300bps modems and rubber acoustic cups. The volume may seem trifling compared to today's deluge, unless you take into account how long it took to retrieve e-mail with a cranky 300bps acoustic modem. Online charges were much higher then: $14.50 per hour on CompuServe, and no flat-rate access. A few lengthy j-mails could really rip your wallet.

After widespread complaints, the early j-mail subsided. This didn't require any rules, regulations, or acts of Congress. Back then, the online community was a tight little neighborhood that didn't need any government interference.

If it sounds like I'm nostalgic for those days, guess again. The online community of a decade ago was like a humdrum rural town; today it's Times Square. The net has grown into a honky-tonk boulevard with bright lights and diversions to satisfy every taste.

But now we have big-city problems. In a small town, everyone knows everyone else, and the threat of being ostracized is usually enough to keep everyone in line. In big cities, anonymity is a shield. You can spray-paint graffiti or even knock over an old lady for her purse while bystanders look the other way. (I do it all the time.) So we have to pass strict laws and delegate enforcement to professionals.

When you consider that a response rate exceeding three percent is enough to give a direct-mail marketer an orgasm, it's easy to see why they love j-mail.

That's what some politicians and frustrated users are demanding for the net. But I don't want to burden the net with onerous regulations or outlaw j-mail altogether.

J-mail only becomes a problem when there's too much of it. J-mail is a marketer's dream because it's practically free—it costs about the same to send a thousand messages as it does to send one message. When you consider that a response rate exceeding three percent is enough to give a direct-mail marketer an orgasm, it's easy to see why they love j-mail. One company in Philadelphia has reportedly sent as many as 700,000 messages a day to America Online subscribers. This company even offers to piggyback your own advertisement on its mailing list of 1.3 million e-mail addresses for only $99. To reach that many people by regular mail would cost you more than $500,000 for postage, paper, printing, and labor costs.

A better solution to the problem of j-mail would require a little reasonable regulation—and some more technology.

Technology is cool. It always creates new problems, then lets you attack the problems with more technology. Of course, the new solution creates yet *another* problem, but hey, engineers have to pay for their Spam, too.

In this case, we pass a law requiring that all j-mail carry an identifying tag in the subject header or message. For example, the tag could be <JUNK>. If the marketing types object, it could be <UNSOLICITED> or even <OPPORTUNITY KNOCKS>.

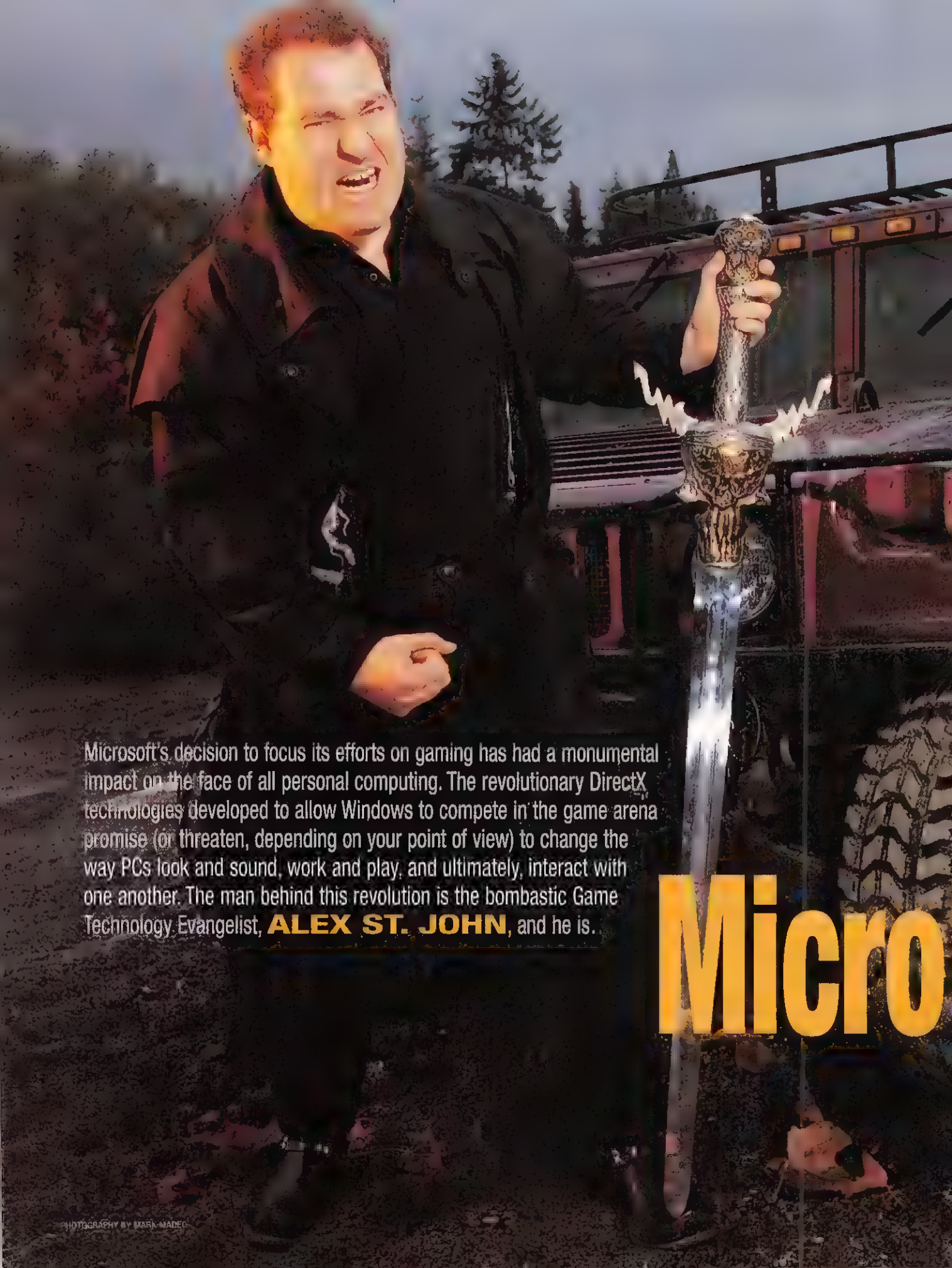
It doesn't matter, because then your e-mail software could scan the incoming messages and delete all the j-mail. Or, you could specify how many j-mails may flow into your mailbox each day. A companion law would require that every j-mail offer an Unsubscribe option that takes you off the mailing list, so the net won't be clogged with messages you'll never read.

It's not like we're running the marketers out of business; we're just giving people a way to tell j-mail from e-mail by glancing at the envelope, just as you do when sorting through your paper mail.

If the j-mail is marked, the filtering technology would be trivial to implement. Yeah, I know there are already bots that claim they can filter your messages by analyzing the content. But they don't catch all the j-mail, and sometimes they delete your wanted e-mail. The only sure method for identifying j-mail is with a standardized tag. We could even define a bunch of tags that let you selectively filter the j-mail by subject, source, and estimated gullibility quotient.

This seems to me like a perfectly reasonable compromise. But if you disagree, please don't send me h-mail.

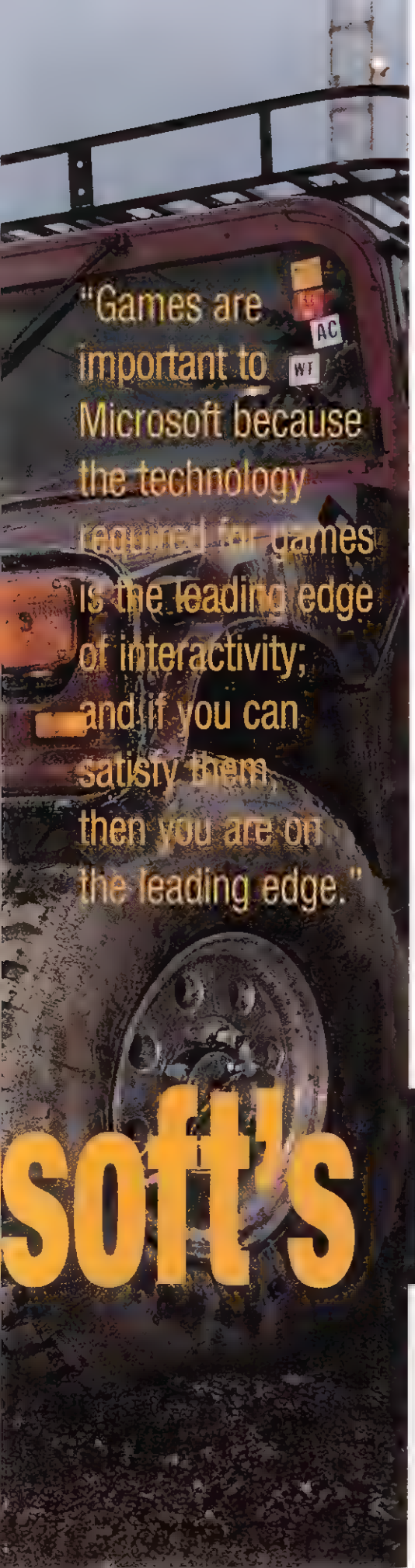
TOM HALFHILL is a senior editor at *Byte* magazine and the author of two computing books. He first became interested in computers during the disco era



Microsoft's decision to focus its efforts on gaming has had a monumental impact on the face of all personal computing. The revolutionary DirectX technologies developed to allow Windows to compete in the game arena promise (or threaten, depending on your point of view) to change the way PCs look and sound, work and play, and ultimately, interact with one another. The man behind this revolution is the bombastic Game Technology Evangelist, **ALEX ST. JOHN**, and he is.

Micro

PHOTOGRAPHY BY MARK MADEO


"Games are important to Microsoft because the technology required for games is the leading edge of interactivity; and if you can satisfy them, then you are on the leading edge."

Lip

THE BOOT INTERVIEW

soft's Messiah

boot: Who is Alex St. John and how did he come to rule gaming at Microsoft?

St. John: Well, I joined Microsoft as an opposing technology man. When that waned, it struck me that Microsoft needed a solution for gaming. There was tremendous opportunity if we learned how to make references and support games. So I asked if I could be responsible for games. A very good friend of mine, named Craig Isler, was a tool evangelist and he wanted to be the game evangelist. We competed and I was eventually hired, but Craig was very good about it.

When I started, I realized it was just ridiculous to think any games would ever run under Windows. It was so screwed up that it was almost a futile job and we needed some technology. So we conspired to get Craig hired into the multimedia development team to create a game SDK. People didn't understand what we wanted to do. We didn't have permission or support to go out and say, "Hey! We're building a technology that's really awesome. Give us money and head count." That never happened. We just said, "We're making a game SDK." It wasn't until three months before the 1995 Computer Game Development Conference that we went beta. We went to Brad Silverberg [Senior Vice President at Microsoft] and showed him what we could do with it, and he said, "That's a good idea. I'm not going to fire you." And so that's how I got into game evangelism.

boot: What inspired you to join Microsoft?

St. John: They dragged me here kicking and screaming. I was making a lot of money in the publishing industry because I had built a postscript RIP interpreter. I had a friend who was a recruiter, who said "Well, can I get you a job somewhere else?" And I said, "No, I'm making grotesque money as a consultant. Why would I do anything else?" He asked if there were any companies in the world that I would consider working for. I said I might work for Adobe and I might consider working for Microsoft. But, they'd have to offer me a lot. And he went away, and I forgot about it. He came back and he had gotten me interviews at both companies.

Microsoft sent a recruiter to talk to me. I had no idea what to expect. You know, I have no college degree and no high school diploma. I was just a guy who happens to be very technical, and so I had no idea what credentials would be required. And, she basically said, "Well, tell me about yourself." I said, "I'm just a guy who does technology. I'm adventurous. I like getting in trouble. Whatever's new, I like to do." That's all she wanted to know.

Around Christmas, I was getting kind of bored with consulting. And Microsoft kept pushing me to come to Redmond. Finally, I did. I went through ll interviews for a job I didn't even want. In the evening, they invited me to this party. They had the entire Seattle Center—seven halls—and they were all just beautiful. One was just a balloon castle, hovering off the floor. They had a monster-mash room with a haunted-house theme. They had a game room with an arcade set up. They had a 1920's speak-easy where you made your own sundaes. They had a circus with carnival rides, and so forth. And after witnessing this, I was like, "Whoa! Any company that treats its employees like this has to be cool." The funny thing is: That was four years ago and it was the last Christmas party they ever did that way. That was actually a lot of my inspiration for some of the mad events I have done for Judgment Day. If they can get away with this for a company party, I can get away with it for a developer conference.

boot: What are you announcing this year at the Judgment Day developer conference?

St. John: We're going to be announcing several new initiatives, partnerships, and announcing the features for DirectX 5.0. We have DirectArcade APIs. We'll be announcing DirectMemory. We'll be announcing DirectMusic. We'll be announcing a lot of new online technology as well, such as new DirectPlay strategies, and so forth... Then we'll really launch DirectX 5.0 next year and that's when we'll put the new generation stuff in everyone's hands. We're making it all work. We're finishing it; polishing; we're making it beautiful and adding the final features that people really need; and integrating it well and making sure the documentation is finally completed. Our developers have asked for a lot more hardcore developer support, so we're having a developer conference for just the major adopters. And then we have all these titles for Christmas. We want to promote them. And, of course, it's just an excuse to throw an outrageous, expensive party—that's really the objective here. What can we get away with? And we're going to have another *Doom* tournament. We're going to have an online gaming tournament. Hopefully *Quake* will be ready in time, so we may have a Win95 *Quake* tournament. Plus a bunch of other games, and we'll bring all our other partners in and help them launch their new hardware and so forth. Make a big deal out of everybody who's doing Windows stuff so that everyone knows what to buy for Christmas. And of course have a wild time; and an excuse to spend $4 million.

"When I started, I realized it was just ridiculous to think any games would *ever* run under Windows. It was so screwed up that it was almost a futile job and we needed some technology."

boot: Are we going to see a new operating system after Windows 95 or NT?

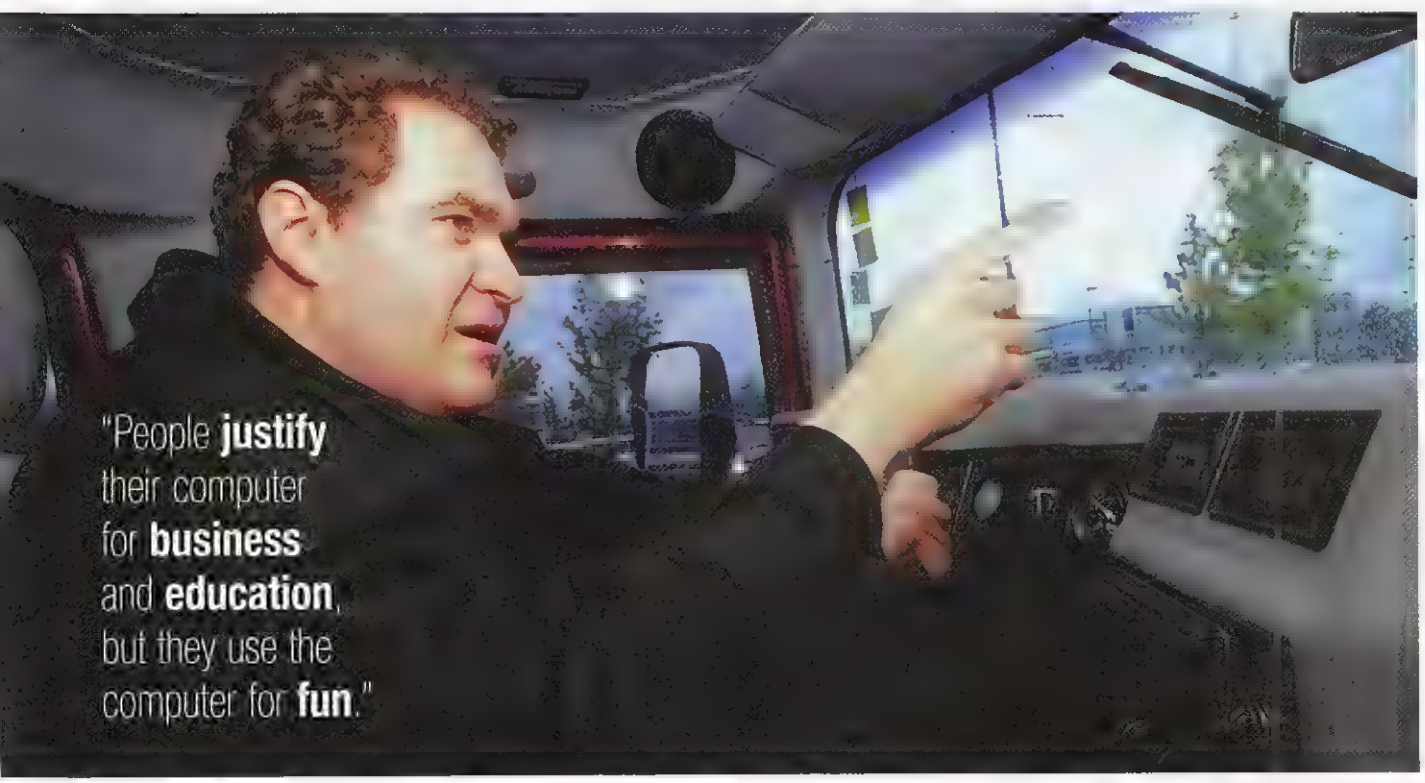
St. John: Memphis is our next major one. Operating systems are funny things. Windows 95 and NT represent separate OSes and we're about to split them and then remix the genetic material. And so the next operating system is going to, hopefully, strongly inherit from the best of both. And whether you call that a new operating system, or you call it NT with Windows 95 stuff in it or Windows 95 with NT stuff in it, is all kind of subjective. A lot of it is derived from the same code base; plus integrating the browser, plus some new features.

boot: So, you'll be making some major announcements in the coming days. What's your chief role here now, compared to the one you played during "the wild days"?

St. John: My chief role these days is as a public figure or something. We had to do some radical things to make games happen. It wasn't just radical technology, it was radical attitude. To persuade the industry that not only were our technologies good, but that we understood what we were doing... we were all a little insane. I got my reputation doing these wild events and my role was working with game companies and making sure the technology was right, working very closely with them to build the right thing. These days a lot of my role is managing the various evangelists. So, I don't get to go out and work with developers nearly as much as I used to, which I miss a lot.

boot: Where do you see yourself five or 10 years from now?

St. John: The funny thing is that I am an engineer, but I keep saying these pretty words, and they keep shoving me out in public and I don't do code anymore. That's a shame, because having the great ideas is really exciting. The degree to which we are managers is the degree to which we *have* to be to make cool technology. It is not the degree to which we want to be. It is really a weird paradox. The reason why we are managers is really to keep fools from having the job. It is kind of painful to have to admit that. We want to be grunts working on the



technology, but they keep putting morons in charge if we don't take the management jobs. Five years from now, I will be retired, very wealthy, and probably go into biotech. We have some interesting ideas for genetic engineering research that haven't been done before. That could be a very lucrative business because there are some problems out there that people really don't know how to solve. A little genius technology will fix that, no problem. We can figure out how to foolproof some software. Don't trouble your heads with that. In 10 years, God knows what. The getting rich thing kind of skews everything.

boot: Well, what's next for you then?

St. John: I really miss evangelism. It's funny... DirectX was successful because we loved the technology. We loved making it. And the trouble is, with success come promotions and other responsibilities, which you're not necessarily as good at as the things that made you succeed. We've shipped so many generations of DirectX by now that we've saturated our developers. They can't adopt the technology as fast as we are spewing it out. The problem is that when DirectX started there was just an enormous amount of work to be done to make the operating system work. A Herculean effort. And that was our kind of thing. Just doing these outrageous things. Now it can be managed. It's incremental releases. And that is not insane enough for us. So we have a couple of proposals on the table for other insane projects for us to work on.

Everyone is so excited about the Internet and it bores the shit out of us. It's like, "Let me get this straight. I can view the same brochures on my computer now at a tenth of the speed that I could when there was a wire attached to it?" There are a million people out there blindly fumbling around and browsing brochures and going, "We can't talk to each other." I think that is a hoot. I can't stand the thing. So, we're thinking about another project to just fix that thing. People don't understand what an Internet should look like. We're going to fix it.

boot: What's the next great game going to be?

St. John: If you look at the top 10 games on the charts, there are two or three *Doom*-a-likes, right? And then there are games that have no correlation with each other: *Command & Conquer*, *SimCity*, *Myst*. And then there are *WarCraft*-a-likes, right? Fundamentally, a great game is either a great piece of technology—it's the best *Quake* engine essentially—or it's a great new idea.

St. John imagines a future where he can walk into the Internet and shout, "I want a Hummer!" and start haggling price.

And because it's a great new idea, it's not something I can sit here and predict, because nobody knows that. If I knew what it was, I'd be making a million dollars publishing it myself. The major thing is, with the market growing, there's a larger pool of companies out there competing for creative content. And that's cool, because in smaller markets your content stagnates. You go to the arcade and all you have is fighting and racing games, because there's only 100 titles each year, and those are known successes.

"We had to do some radical things to make games happen. It wasn't just radical technology, it was radical attitude."

If you're not a known success, you're losing money, so you can't afford to be creative. In the PC market, people shipping creative weird stuff can make money and as long as that's the case, we're gonna get cool, unique new content. And the next big thing will be something that we don't know about right now, and thank goodness that's the case.

boot: How many hours per week do you spend playing games?

St. John: It's not like you have much time around here. I used to play *Ultima* religiously. Now, games pass under my fingertips. I don't get to sit down and consume any one of them. We just play the demo for 15 minutes. The trouble is, the amount of time Microsoft consumes is so staggering that you can't consume them all. I probably spend two or three hours a week playing games, but I'm not enjoying them as much as I used to. Some of the people that work for me get to play a lot more often than I do. Apparently, they don't have enough to do.

boot: Describe your own personal computer. The one you play games on.

St. John: Well, the machines I play on are here. I don't go home. I live here. This Falcon is one of our favorites. The P133 32MB Falcon. It's got an AWE 32 sound card, and a Rendition 3D accelerator that we added, and a big hard drive, and a monster monitor from hell. That's the cool thing about this job. We see games no one else has. When we get new Direct3D games, we play them on the MMX machine because it goes like 10 times faster than anything we experience right now.

boot: If you were putting together a system today, what components would you choose?

St. John: Well, obviously I'd want the latest state-of-the-art Pentium. If I could get an MMX machine, I would. If I were buying a 3D card, I'd probably get a 3Dfx-based one, or a Rendition-based one. Either is a very good accelerator solution. For joysticks, ThrustMaster is still it. The Microsoft joystick is also very good. For audio, I think there's going to be another major leap pretty soon, but the AWE 32 line with hardware acceleration for audio and extra memory on the audio card is key right now because when you're using a DirectSound game you can offload to the hardware. There are some new PCI-based sound cards coming out that really speed up audio playback.

boot: AMD just killed off the Interwave. What do you think that says about where PC audio is heading?

St. John: Now see, that's a shame, because they didn't make the jump. Sound Blaster compatibility is going to cease mattering next year. What's going to be more important is just how fast your audio is. Can you do 3D positional audio? Can you offload the sound mixer? Do you have an audio cache and do you have PCI DMA audio, so you're not loading the bus up? And if the answer is "yes," then you have a great audio station. But with DirectMusic coming out next year, it'll be a while before I'd make recommendations. Still, if you have a good MIDI solution that can support dynamic MIDI-patching, then DirectMusic will do that too. We just licensed the Roland MIDI set so that the default MIDI-patches for DirectMusic are going to be rolling high quality audio.

boot: What else will be important for your home PC, in order to maximize all these new technologies?

St. John: Having as much RAM as possible. RAM absolutely rules. Having the biggest cache possible helps a lot too. People don't realize that the size and speed of your cache is very important for most 3D games. The other thing is the quality of the video card. The number one question is, "Who's shipping the most stable DirectX drivers?" And that, unfortunately, changes from day to day. It's really between the Rendition or the 3Dfx or between a Diamond and a Cirrus and an ATI card. The differences in features and functionality are marginal compared to the stability of the driver. The quality of the driver is going to impact their gaming experience 'cause the game is no fun if it goes "boom!" It doesn't matter what the damn hardware is these days; all the hardware is cool. "Who's got the working drivers?" That's all that matters.

"You go show the **Internet** people a little ball spinning on a **web page** and they're like 'Oooo... Aaah... **Multimedia**.' So, we just throw a little game **technology** onto the net and everyone will be **impressed**."

boot: What will the PC look like in two years?

St. John: Consumers are going to have a dramatic impact on PCs. Exactly how is kind of hard to predict. The thing that bores the hell out of me is beige boxes. Gray corporate form factors. As consumers start influencing the look of PCs, you're going to see them getting sexier. And that's very cool. Media capabilities—just in the year that DirectX has been available—had a huge spike. A huge jump from 320x200 graphic mode to 640x480, and the appearance of 16-bit color and what have you. And much better audio quality. In two more years I think you're going to just destroy any other kind of multimedia experience you can buy. Money will not be able to buy anything better. You're not going to get it in a console. You're not going to find it in an arcade. The very high resolution, very high color-depth, 3D graphics, simultaneous voice/data over the net, higher bandwidth connectivity is going to be on the PC. I would like to believe that VR with stereo vision and headtracking are going to be a key part of those machines. It's so compelling that you just have to believe that we can find a solution.

boot: Will televisions accessing the Internet change the world?

St. John: Well, that's ridiculous. A lot of people smoking their own stash. There's a reason why you use your computer monitor for looking at text and that's because your TV has no sharp masking. Let me get this straight. The same people who demand the highest, richest, most interactive experiences with games on consoles are going to be satisfied slowly browsing the Internet with big fuzzy text letters the size of coconuts? I don't think so. You'd have to buy a new TV, and you can get a computer for the cost of a TV that's capable of that type of display quality. So I think that's bullshit. It's actually been tested before. Any number of console-like devices that plug into your TV have these kinds of capabilities. No, they haven't been the Internet necessarily, but they've pulled from multimedia titles or encyclopedias or they've done personal computers like the Commodore VIC-20 or the Atari. Those machines died out. Those were great consumer devices *at one time*. Why did they vanish? Because the uses for those machines exceeded the display devices' capabilities. They exceeded them 10 years ago and we're not going back. So the notion that people are going to use TV sets for Internet browsers is ludicrous.

boot: What will be the most significant development in gaming in 1997?

St. John: There is going to be a synthesis of disparate things that are going to unite as a huge change. Obviously 3D changes the experience. And it's not just 3D graphics. It is 3D sound. It is force feedback. It's really a tremendously powerful input paradigm that is growing out of gaming—3D graphics being the most obvious symptom of it.

"... the notion that people are going to use TV sets for Internet browsers is ludicrous."

The other thing is networking, and it is not the Internet. The Internet sucks. Games today are just software. You consume your content, you throw it away, and you buy another game. It's a very masturbatory experience. You do it by yourself. Even with the network games built today, networking is an afterthought. A tiny number of *Quake* players actually get on a network. About 95 percent of them are going to play it by themselves. And networking is just a nice added feature that is good for marketing. Because of the work we're doing with DirectPlay, games are going to be virtual worlds that exist on the net 24 hours a day. The game client is going to be something that you give away. "Here, have a client, they're free!" The game industry is going to go from making the money on the client to making the money on expansion features. "Here, buy a better weapon kit if you really want to kick butt."

Persistent personas in a virtual world are going to be cool. Content generated by complex interactions with other people is going to be the predominant paradigm, vs. the prerendered AI that people used to have. That's going to come very rapidly. 1997 will be the year where it becomes obvious that's where it is all going. A lot of people will be seeing a lot of light bulbs going on and realize what a powerful paradigm that is.

What just kills the hell out of me is when we had a multimedia workshop and we would compare it to Netscape. They'd go, "Look, we can play video on a postage stamp. We have three more formats than they do. Here is a robo-whirl that runs at three frames per second, cachunk, cachunk, isn't that exciting?" That's multimedia on the net. Then you launch *WarBirds*. And you hit 640x480, 60 frames per second. No matter how slow the Internet was, our world ran at 60 frames per second, and you'd be flying around with 200 other people in texture-mapped airplanes and gutting the hell out of each other. That's the way. There is no reason you should ever see a timer. There is no reason you should accept less of a multimedia experience, just because a bunch of browser makers are making the stuff.

You are going to see the net become a much richer, much more cool thing. And that is going to branch out well beyond the games—but the games will be the leaders. DirectPlay is going to create a market for virtual worlds, making it easy for people to play, making it easy for companies such as Dwango and Mpath to add more services. You're going to see it used for buying cars or carrying out any kind of business negotiation

or transaction. DirectPlay is just a great way for people to interact on the net. I bought my car on the Internet. But that was very primitive. I couldn't go and see the Hummer. I didn't have a 3D model to look at and try different fabrics, I had to just visualize them. But still, I'd do all my shopping that way because I saved 14 grand. I just want a way of saying "Hey, I want a Hummer!" and finding all the people who want to sell me one and we all gather in the same space and haggle it out. What a very effective way of carrying out commerce. But that just doesn't exist. The medium is sitting there, but browsers are not the way. I think the game technology that we are making for DirectPlay is going to be very applicable and I think that's going to change everything. It's hysterical to us, because, a game such as *Quake*, is state-of-the-art multimedia to us. You go show the Internet people a little ball spinning on a web page and they're like, "Oooo... Aaah... Multimedia." So we just throw a little game technology onto the net and everyone will be impressed.

boot: Obviously the Internet wasn't designed for games.

St. John: It should have been. But it wasn't. We're going to fix that. The same way that we made it possible to sell digital joysticks with lots of buttons by creating an API standard; we'll allow people to build online games and do it any way they want, as long as it works. There's no money in it today. And as long as there's no money, game companies aren't going to build great online games. The major purpose of DirectPlay is to create a marketplace so these guys can make content that would sell. We're trying to get the money flowing. As soon as the money's flowing, there'll be people out there making cool content. And that's very important to us.

boot: Why is gaming important to Microsoft?

St. John: Microsoft built itself by doing business applications. Just software tedium. An entire industry was sitting out there and we were blind. The whole game thing just existed over there, you know, in DOS. The funny thing is that games only represented eight percent of the software at the time. They sucked. They were impossible to use. They were for geeks who could understand DOS. A very narrow audience. Mind you, I was one of them. It was easy to rationalize, to think that it's not important. Then Microsoft saturated the business phase and started to look around and say "What are we going to do in the future?" Bill invests very heavily in finding these things, so he puts a lot of smart people on the task. Personally, I think that we found the Holy Grail of media because games are now 80 percent of all software that is written for general purpose computers. It's a $14 billion market.

People justify their computer for business and education, but they use the computer for fun. For the PC to really become ubiquitous, it must really be a fantastic entertainment place and games are the superset of all entertainment technologies. There is nothing more demanding on your computer than *Quake*, because nothing asks more. And game companies are on the leading edge of that. If you have multimedia capabilities to satisfy the needs of *Quake*, you can do anything. And so games are important to Microsoft because the technology required for games is the leading edge of interactivity; and if you can satisfy them, then you are on the leading edge. b

*The wisdom and insight of **Alex St. John** could not be contained in a single installment of Lip. Next month, we continue our conversation with Microsoft's Game Technology Evangelist, where he explains why DOS is dead; who poses the biggest threat to Microsoft's monopolistic hold; why console game makers just don't get it; and all the innermost secrets of DirectX.*

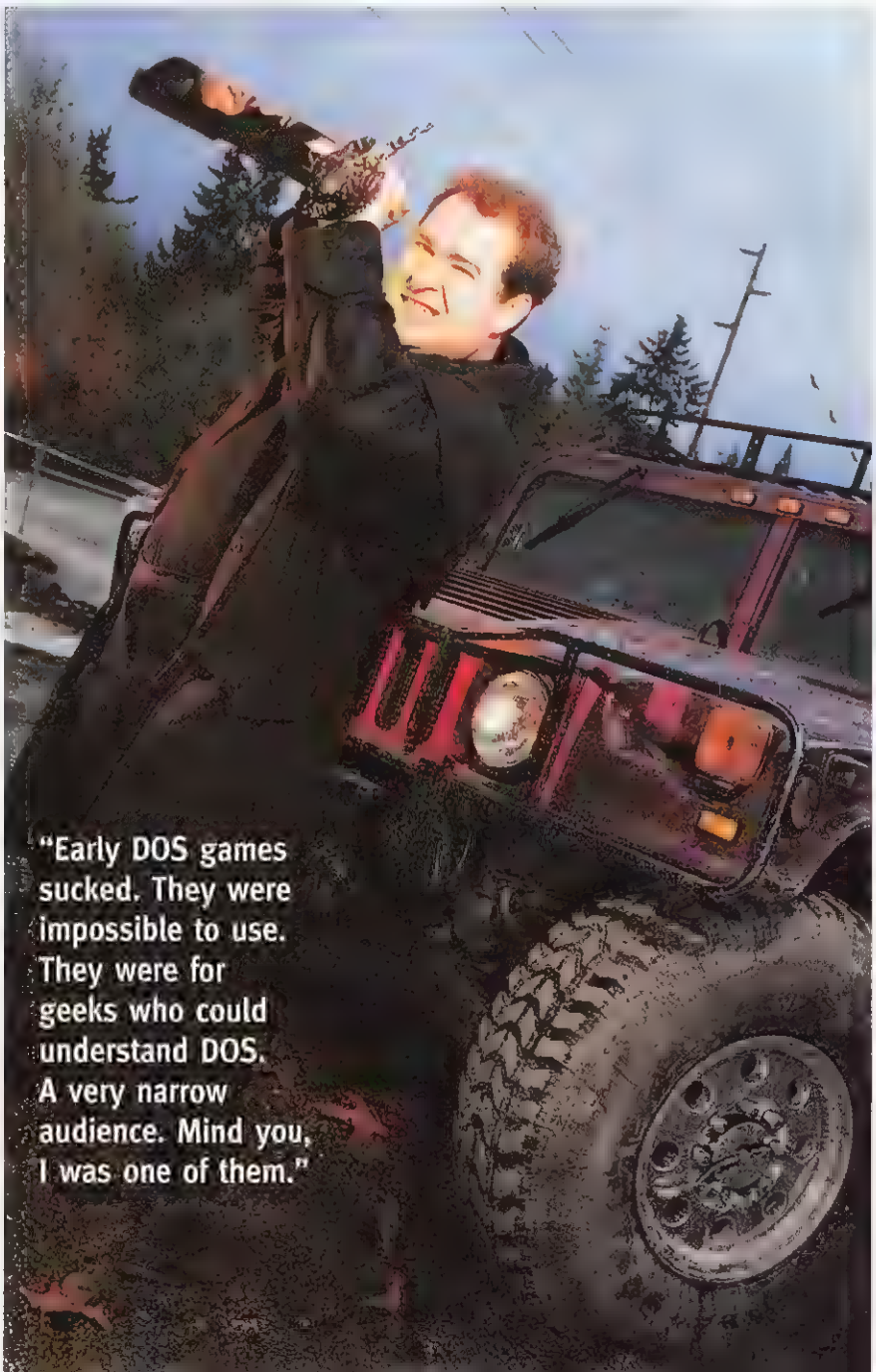

"Early DOS games sucked. They were impossible to use. They were for geeks who could understand DOS. A very narrow audience. Mind you, I was one of them."

ILLUSTRATION BY LOU BEACH

Reality Manipulation with PHOTOSHOP

A Step-by-Step Workshop of Special Effects You Can Easily Do On Your Own PC

BY DAN DOERNER

Adobe *Photoshop* is the world standard digital photo-editing tool. Not only can images be adjusted, cropped, color corrected, and sharpened, but magical special effects can be created easily. Through my years of experience with *Photoshop*, I've come across several handy techniques that have simplified difficult tasks or helped in the creation of original art.

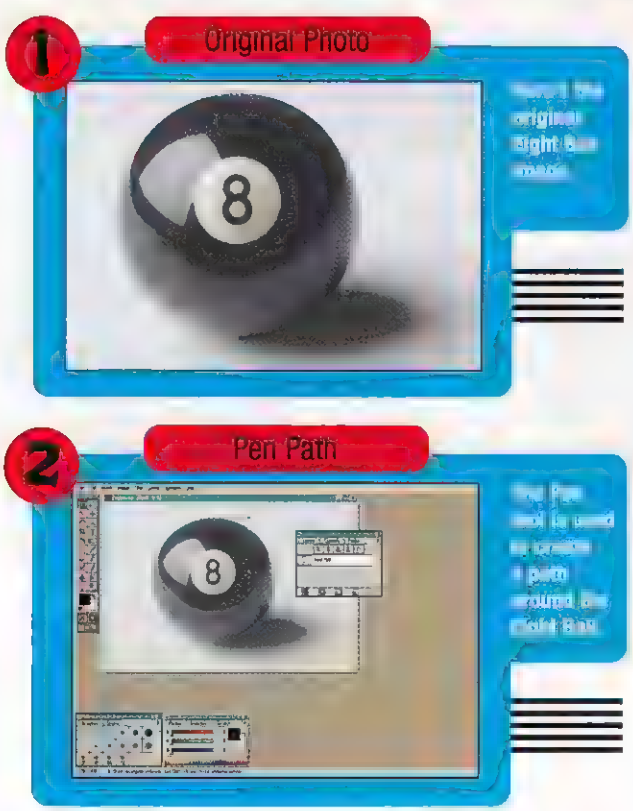
One of the most useful techniques allows you to create shadows or maintain natural shadows when a background is changed. Another important skill is to know how to colorize black-and-white images. I'll take you on a ride through my creative colorization process.

Putting practicality aside, we'll create other-worldly scenes featuring colorful spheres that magically attach to each other. After that you'd be disappointed with anything less entertaining, so we'll generate great original background textures from scratch.

My strongest images feature surreal photo composites, and here you'll learn how to make magic with reality.

Some of the most startling visual effects can be created with the simplest techniques. So spin-up your hard drive and let's get started.

Try it out!
demo on the bootDisc
Adobe Photoshop
The Demo version of Adobe *Photoshop* is on this month's bootDisc.

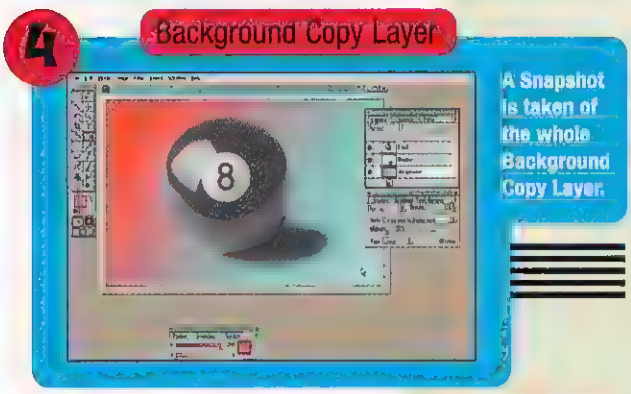


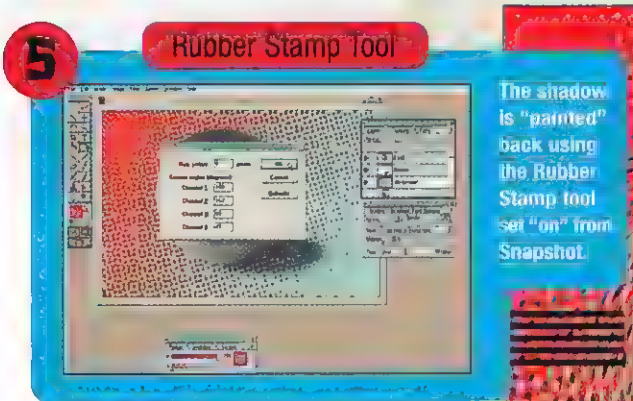
1 SHADOW TECHNIQUE

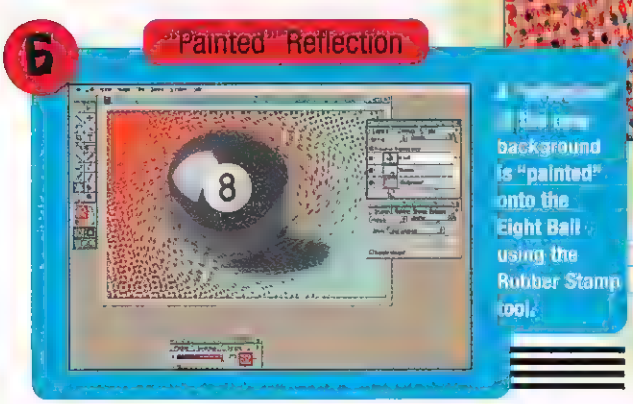
Here is a way to create a shadow or maintain the original shadow in a photograph of an object after deleting or modifying the background. First, make a Pen Path around the object. Turn the path into a selection and float the selection into a new layer called "object." To maintain the original shadow, duplicate the background layer into a new layer called "shadow."

Take a snapshot of the shadow layer, Select All, and delete everything in that layer. Set the layer mode on "Multiply" and then select the Rubber Stamp tool and set the option to "From Snapshot." Choose a fairly large soft-edged brush and carefully paint back the original shadow. If the object has straight edges you can paint back the shadow in a straight line. To do this, simply press "Shift" as you click the start and end-points of the painted line. As you go over the shadow, you will see it darken because of the Multiply mode.

To preview your new shadow, turn off the view of the original background layer. When the shadow looks natural you can replace the background with any texture or image. The Multiply mode on the shadow layer will make the shadow blend in nicely with the new background. If the object with its shadow are to appear as part of a white page layout simply discard the original background layer.







To create a new shadow there are two techniques. If the object to be shadowed is flat, you can duplicate the object layer and fill the layer below with black. Make sure to click "Preserve Transparency" so that the black only fills the object area. Then turn off Preserve Transparency and use the Gaussian Blur filter set between "3," for lower resolution files, and "6," for higher resolution files. Now with the Move tool, drag the shadow to offset it from the object.

If the object to be shadowed is three dimensional and you want to cast a dimensional shadow, take the object's pen path and move it into your envisioned dimensional shadow space. Of course, having some knowledge of perspective is helpful in determining where a realistic shadow would be. Once your pen path is in the shape of the new shadow, turn it into a "Selection," feather the selection three to six pixels and fill with black or your choice of shadow color. You can now save the file.

The second technique involves painting in the shadow from scratch. This will take some skill and is best done with a cordless, pressure-sensitive tablet. Don't expect professional results from this technique until you've had a lot of practice.

Final Image
7
The final image shows the Eight Ball with its original natural shadow on a new background, with added reflections of the colors on the ball.

2 CREATIVE COLORIZATION

There are several ways to colorize images in *Photoshop*. One way is to create a duotone image. Start with a black-and-white photograph or convert an RGB image to grayscale mode. Select "Duotone" from the Mode menu and make sure the "Type" option is set to Duotone. Select two colors to work with by clicking on the color swatches.

First, you want to change all the white in the image to one of the chosen colors and all of the black to the other color. You only need to change the image map curve for the color that you want to replace white. To do this, click on the "Curve" button for that color and change zero percent to 100, and 100 percent to zero. Then click "OK."

If you are not satisfied with the results, go back into the "Duotone Dialog" and change the colors or the curve settings to your liking. You can go into the "Duotone Dialog" as many times as you want without deteriorating the image. At this point, save your file and try several other color combinations for an Andy Warhol-esque series of art.

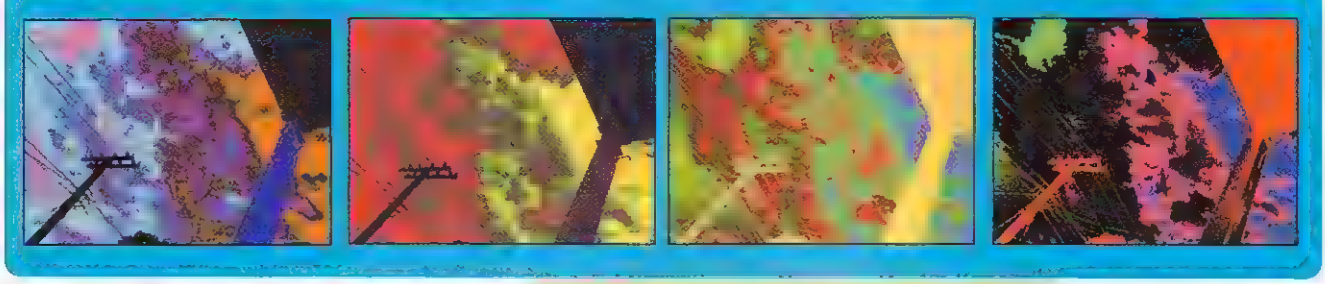
Now convert the mode to RGB color and try simple color variations by adjusting the controls in the Image>Adjust>Hue/Saturation dialog. By adjusting the Hue Slider, you will cycle through basic combinations of two colors. If you click on the Colorize button, you will by default get a fully saturated red effect. Now move the Hue and Saturation sliders for fun, single-color effects.

Original Photo

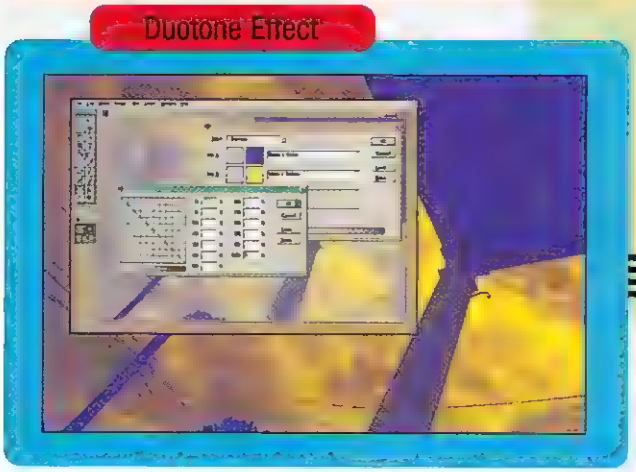
For wilder color combinations, try the KPT Cyclone filter from MetaTools. This filter randomly rotates the color lookup tables to show innumerable combinations. Whereas the previous effects featured one or two colors, the KPT Cyclone filter inserts additional colors for a multicolor solarization effect.

As you watch the colors change, touch the spacebar to pause and hit Return to save the image. You can save several colorized variations of your original black-and-white image and display them all together, either in one *Photoshop* file or as separate printouts.

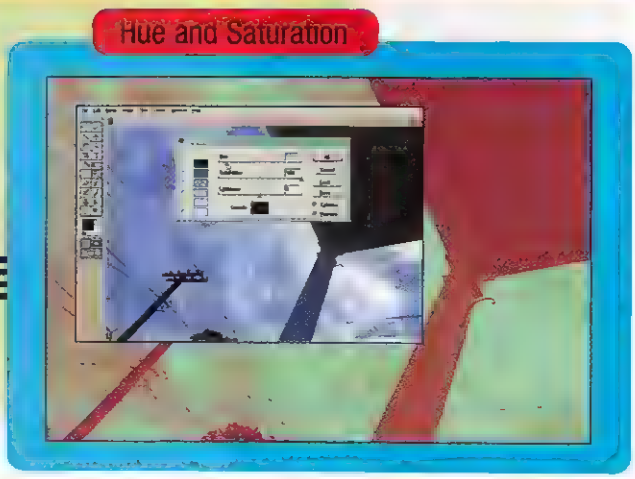
Cyclone Effects



Duotone Effect



Hue and Saturation



3 PIGGYBACK SPHERE TECHNIQUE

While *Photoshop* can be used for many practical and mission-critical projects, it can also create interesting original graphics. One fun technique offers a simple way to create different-sized connected spheres, which have a striking, organic appearance.

To do this, create a new file in *Photoshop*, Select All and fill with black. Double click on the Gradient tool which will bring up the gradient tool options. Set the Mode on "lighten," the Opacity at 100 percent, the Style on "Foreground to Background," the Midpoint at 50 percent, the Radial Offset at zero percent and the Type on "Radial."

Select a bright color to paint with and make sure that black is set as the background color in the Tool Box. With the Gradient tool selected, click and drag a short line in the image window. You will see a sphere appear. Now try creating another sphere touching the first one. The second sphere attaches itself to the first.

You can continue to choose different bright foreground colors as you create the spheres, and of course, the spheres can be any size you want.

For a different look, try creating spheres on a white background by changing the Gradient Tool Options Mode to "darken" and the background color to white. Try experimenting with different size spheres and different colors. And by creating a large sphere with a slightly darker foreground color, it will appear behind smaller, lighter spheres.

By adjusting the Midpoint setting to a lower percentage level the spheres will fade off more on the edges with a noticeable point of light in the center. Increasing the percentage level will give the spheres a sharper edge and make the center point of light less noticeable.

Lowering the opacity in the Gradient Tool Options will generate more subtle spheres. Increasing the Radial Offset, meanwhile, increases the light reflection. If you change the Radial Gradient to a Linear Gradient, you can add a colorful horizon line to the image.

It is surprising that this simple, yet powerful technique is not used more often.

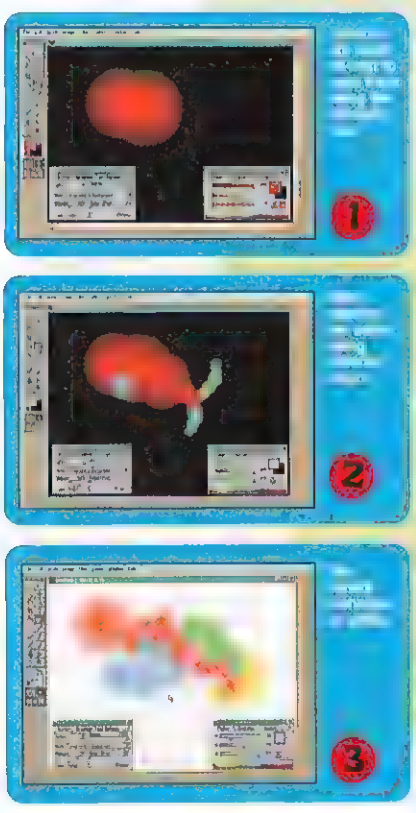
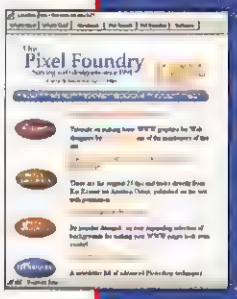
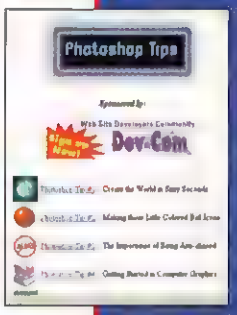


Image Oriented Web Sites

There are several useful web sites for image editing. One is The Pixel Foundry (the.tesh.mit.edu/KTP/) which features the full set of outdated Kai's Power Tips & Tricks for *Photoshop*. This site also has lots of tips and resources for web designers.



Another useful site is Laurie McCanna's *Photoshop* Tips Page (www.mccannas.com/pshop/photosh0.htm) which offers many handy tips for Adobe *Photoshop*.



There's a good *Photoshop* Q&A page at (www.cyweb.com/~misc/photoshop.html) where you can type in a question and someone will answer it.

If you want to download lots of free/shareware/demo *Photoshop* plug-ins, take a look at this web site (www.fms.net/~almateus/filplug.htm) or this FTP site (ftp.asi.com/pub/photoshop/).

Most software manufacturers also have their own web sites. These sites are the best place to look for software updates and technical support.

Microsoft

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Beirut, A.D. 2500.

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Rainbow Studios

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www.microsoft.com/games/deadlytide/

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4 COOL BACKGROUND PATTERNS & TEXTURES

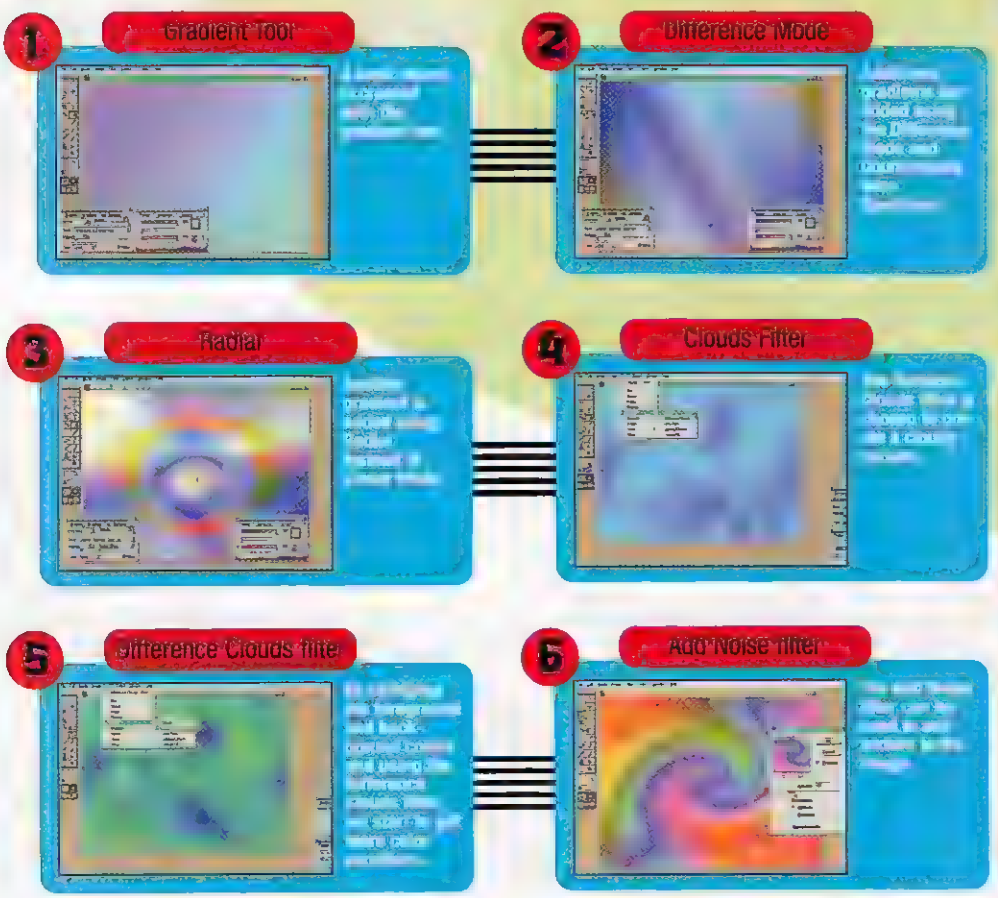
To create unique backgrounds from scratch, it's best to start with a gradient. Pick two colors and do a blend with the default settings. Next, change the Gradient Options to "Difference Mode" and the Style to "Counterclockwise Spectrum" and continue to draw gradients. You will slowly begin to build a complex color field. You can also set the Gradient Options on one of the Spectrum Styles to create multicolor gradients.

There are numerous options you can try to further enhance the image. For instance, you can open up the Twirl Filter from the Distort Menu and twist the image. Adding Noise gives you a different texture. You can also run the Terrazzo Filter from Xaos Tools to create a repeating kaleidoscopic pattern.

If you like Fractal noise, try running *Photoshop*'s own Render>Clouds Filter. This effect uses your foreground and background colors to create a wispy cloudscape. Run this filter once, then try the Render>Difference Clouds several times. As you continue to execute this filter your background texture will take on more and more complexity and color, and interesting veins will start to appear.

If you have Kai's *Power Tools* you can create interesting background patterns with the Texture Explorer or the Gradient Designer. Beautiful gradients can be built by repeatedly running the Gradient Designer in Procedural Mode. For instance, start by creating a basic gradient in the Gradient Designer. Click "OK" and open the Gradient Designer again. The same settings will still be there. You can simply rotate the gradient and set the option to "Procedural Blend" and click "OK." Do this a few times until the gradient is as colorful and complex as you would like.

There are now many options for backgrounds and textures, either as stock image CDs or in the form of plug-in filters that generate automatic textures. But you can easily do your own by experimenting with the built-in functions of *Photoshop*.



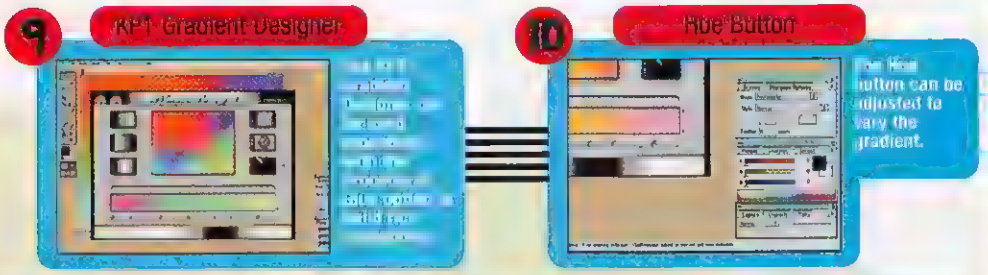
Digitization of Images

There are several ways to digitize your images. One of the easiest methods is to have a Photo CD made from your negatives or slides. This can cost anywhere from 89 cents to $3 per image, plus a small charge for the recordable CD-ROM media. The process entails taking your film to a processing lab for scanning to Photo CD format. The lab will put your images onto a CD-ROM and include an index print, which serves as a proof sheet. You can fit up to 100 images and get up to a 72MB file. One drawback of Photo CDs is that it often takes a bit of tweaking to get the right color and contrast out of your images. However, the cost benefits outweigh the disadvantages of having to do additional adjustments.

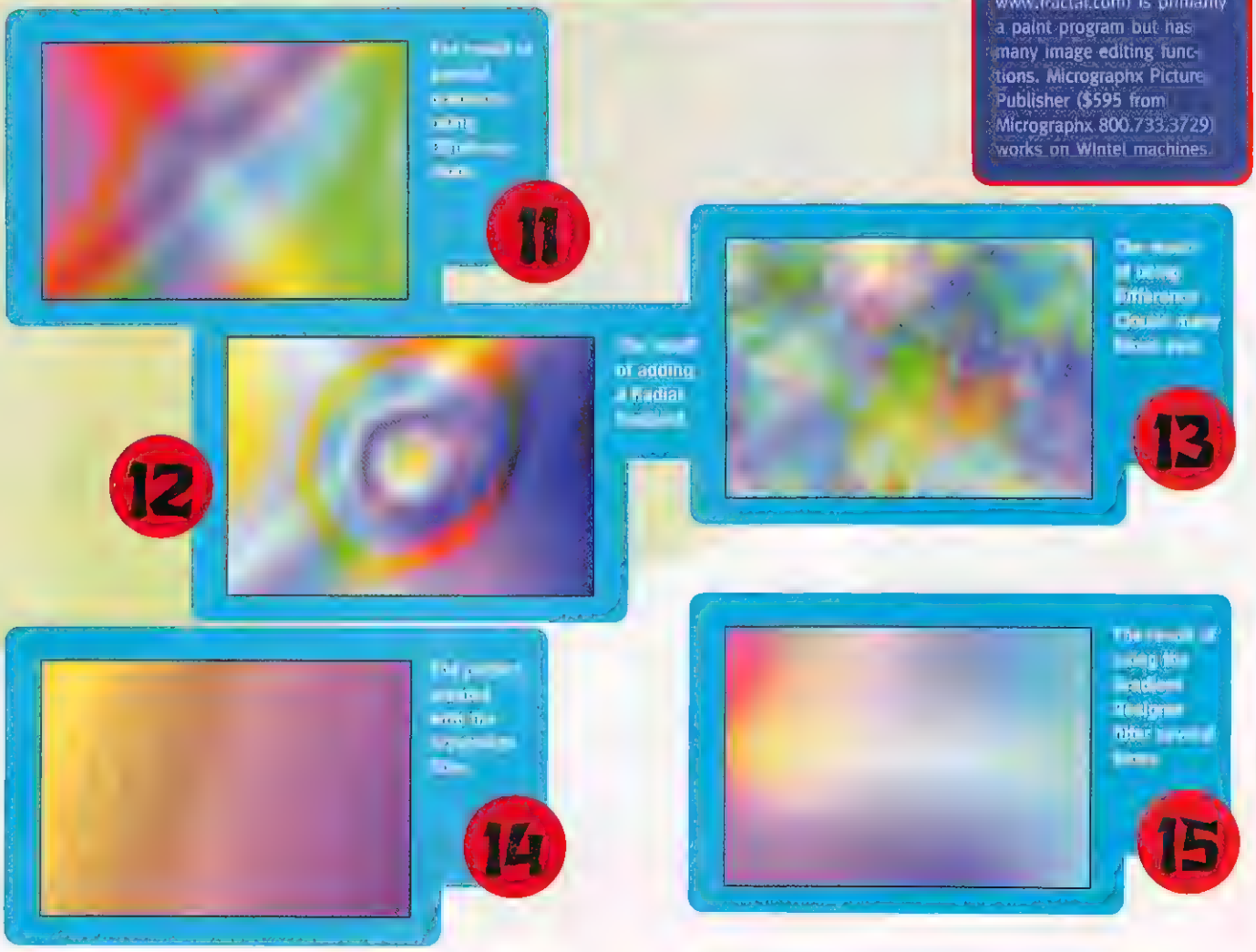
You can also scan the images yourself on a desktop flatbed scanner or with a slide scanner. A color flatbed scanner can cost you as little as $300 and give you excellent results. It may take you some time, however, to learn how to scan with optimal results. A major disadvantage with scanning the images yourself is that you'll need lots of storage space on your hard drive or on some removable media.

Slide scanners start at around $900. A main advantage of scanning a slide or negative over scanning a print is that you are using the first generation image and are not subject to color shifts that may be introduced on a printed photograph.

When scanning images yourself you'll need to consider what resolution will be best for the project. Images that will appear only on screen can be scanned at 72ppi. Whereas images for print need to be scanned at higher resolutions, such as 300ppi.



Final Images



Other Image Editing Applications

Besides Adobe *Photoshop*, there are several other excellent image-editing applications on the market. *Live Picture 2.5* ($995 from Live Picture Inc., 800.724.7900, www.livepicture.com) or *xRes 2.0* ($679 from Macromedia, 800.326.2128, www.macromedia.com) use proxies instead of the actual file allowing you to work quickly with very large images. *Fractal Design Painter* ($549 from Fractal Design Corp., 800.297.2665, www.fractal.com) is primarily a paint program but has many image editing functions. Micrographx Picture Publisher ($595 from Micrographx 800.733.3729) works on Wintel machines.

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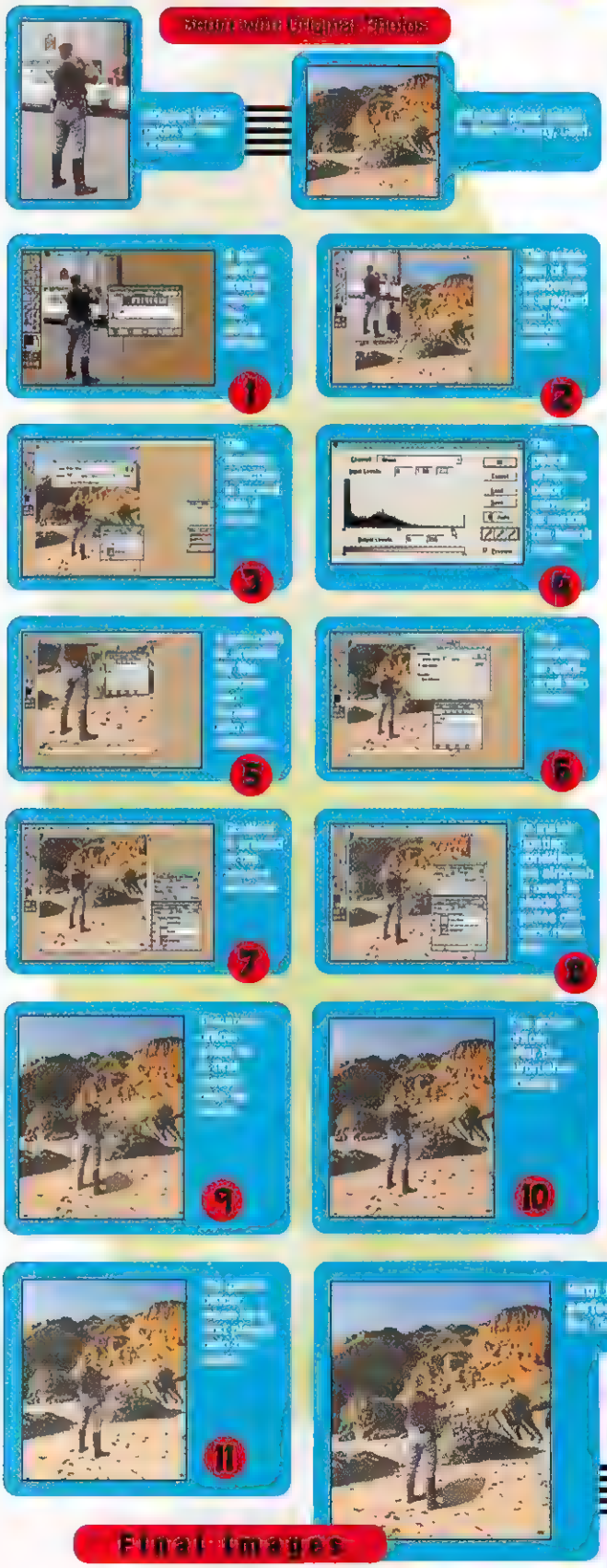

5 BLENDING IMAGES

One of the most powerful types of visual art is the photocomposite. *Photoshop* is a great tool for creating these kinds of images and there are many ways to go about it.

I often look through my photographs for interesting juxtapositions to create a surreal scene. For this example, I've chosen an image of a police officer to drop onto another photograph of a beach scene and add a shadow.

Often, the best way to select an object or part of an image, in this case the police officer, is to use the Pen tool (in the Paths palette). Carefully click and drag around the edge of the object. It is best to place all the points first, then zoom in a bit and edit the path with the Arrow tool (also in the Paths palette). Keep the path slightly inside the edge of the object to avoid selecting any of the background. Once the path is complete, turn it into a selection and copy or drag the selection to the destination file, placing it into a new layer.

Position the object in the destination file so that it looks natural. Specific things to consider are lighting, perspective, relative focus, shading, and shadowing. Take notice of the lighting and try to match the two images. In the case of the police officer, the lighting in his scene was overcast. The beach scene is very sunny and contrasty. To make the police officer look natural on the beach I had to adjust the contrast and color balance with the Levels dialog.

Noticing the light direction in the beach scene, I airbrushed some black paint on the right edge of the policeman to match the harsh shading on the rocks behind him. I also lightened his left side with the Dodge tool. Then all that was needed was a natural looking shadow on the sand at his feet. It's best to create a new layer for the shadow so that it is fully editable.

To create the shadow, I drew a pen path in the approximate shape of a shadow. When making a selection out of the path, I feathered it two pixels. With the eye dropper I sampled the shadow color from one of the rocks. Using the Gradient tool set on Multiply Mode and Foreground to Transparent, I filled the feathered selection with a shadow blend. Then I decided to invert the background and the police officer's shadow to create a very surreal scene.

Dan Doerner is the Technology Director at Publish *magazine. In his spare time he teaches* Photoshop *at The Center for Electronic Art in San Francisco, Calif. He has been working with* Photoshop *since 1989, and his artwork has been shown in exhibits, books, and magazines, and is currently shown on the Adobe* Photoshop *CD-ROM.*

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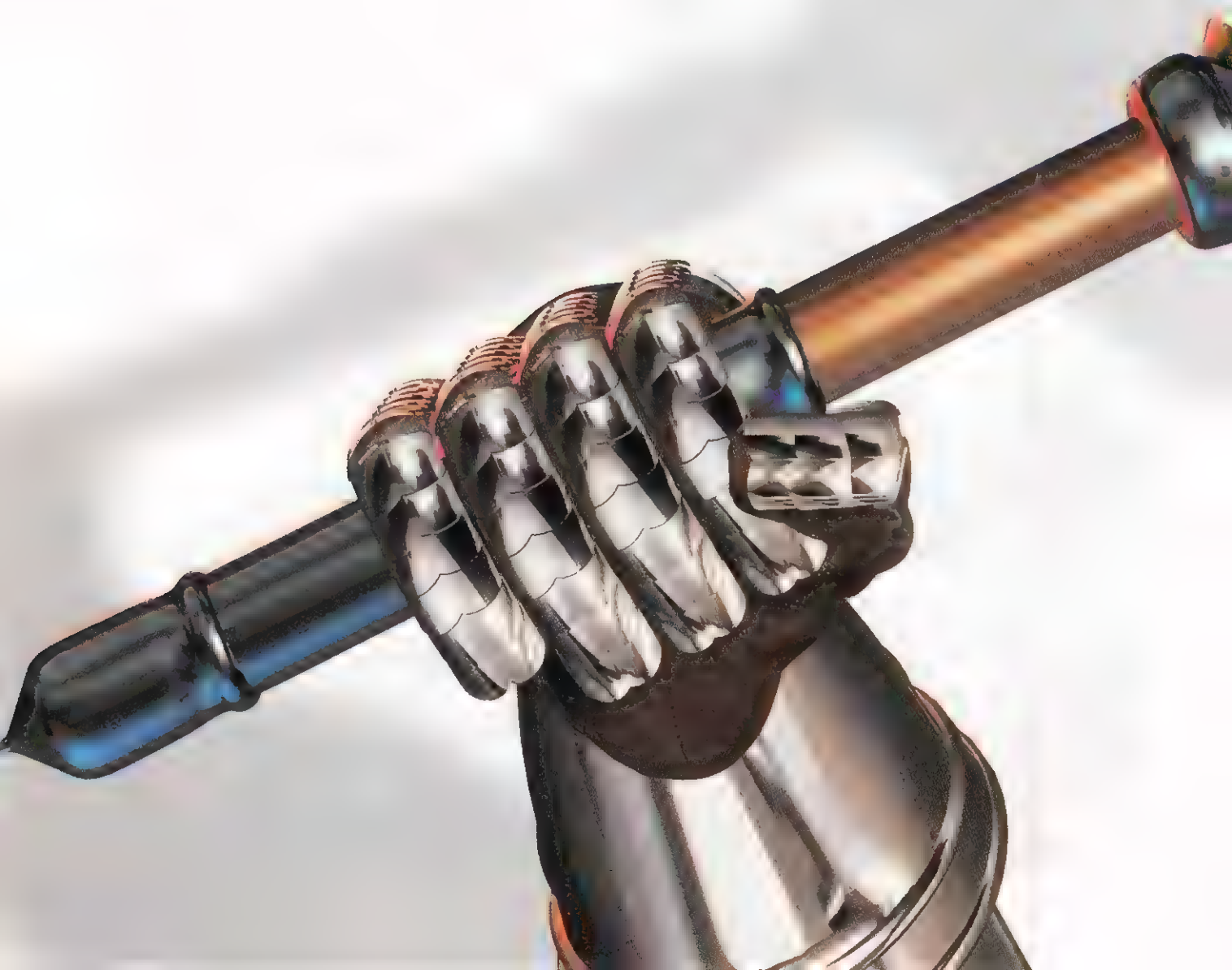

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Product Information Number 250

PURE POWER PREVIEW '97

1996 was the year major **hardware** manufacturers recognized the **hardcore** home **PC** owner as a force to be **reckoned** with. They responded with **"ultimate"** machines that occasionally lived up to their billing. **Brace** yourself for 1997 with *boot*'s **PURE POWER PREVIEW**: A complete rundown of all the **tools** and **technologies** that will rumble your **desktop** in the coming year.

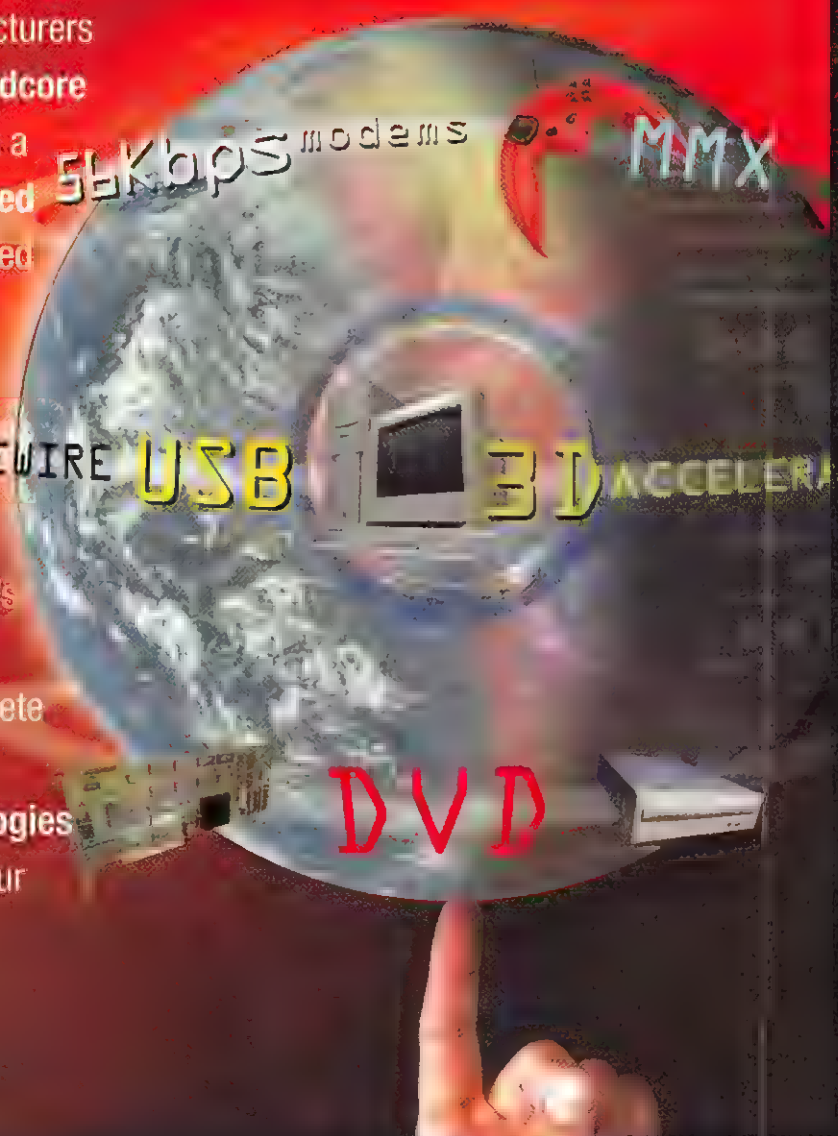

ILLUSTRATION L. MORRIS

BY BRAD CRAIG

1996

What a year. We saw 200MHz Pentiums. Pentium Pros showing up in home PCs. 3D graphics accelerators down on the motherboard. 9GB hard disk drives. 12x CD-ROM drives. Innovative memory architectures. Well, if you thought the pace was fast last year, you ain't seen nothin' yet. 1997 will have our heads spinning.

With MMX, Intel is sucking so much functionality into the Pentium's onboard instruction set that the company claims you'll never need a new sound card. Intel competitors Cyrix and AMD have some multimedia tricks up their sleeve, too.

It took a while to catch fire, but 3D graphics acceleration is now a raging inferno, showing no sign of cooling off. Upstart video chip designers such as 3Dfx and Rendition have tweaked the noses of industry giants S3 and Cirrus Logic; meanwhile, Chromatic Research is getting ready to pour its own can of gas on the blaze.

I/O speeds and feeds are also going through rampant change. USB-equipped computers have been shipping since last May, but few peripherals have take advantage of them yet. Soon, devices ranging from gamepads to keyboards to flatbed scanners will take advantage of this new serial communications port. And the IEEE-1394 bus, commonly known as FireWire, is poised to take off in the coming months. Look for new image-capture cards, digital video-editing systems, scanners, and other peripherals that demand a fat data-transfer pipe to take advantage of this promising technology.

Whatever your bag—gaming, modeling, design, web publishing, illustration, you name it—you'll be able to do it better and faster in '97. You're also going to hear a lot of whining from people who just don't get it. "I just bought my computer, and now there's already one that's even faster." Screw 'em. Those Luddites would use XTs and CGA monitors, just so they'd never have to buy another piece of hardware.

A new era in personal computing is dawning; an era in which the power user is king. Here's your first look at what's coming down the pike.

A **new** era in personal **computing** is dawning; an **era** in which the **power** user is **king**.

MMX: The Pentium: Here today, gone tomorrow

It's been difficult to keep track of the Pentium processor. In the course of a few short years, its speed has jumped dramatically. But it hasn't been difficult to track the new P6 processor chip with integrated multimedia instruction extensions (MMX). Why? Because Intel still hasn't shipped it. Originally slated to ship in late 1996, MMX's debut has been delayed until January 8th, 1997.

At its core, MMX is operating system transparent, and because MMX technology consists of general-purpose instructions, it will enhance performance while maintaining complete compatibility with all existing Intel architectures. In addition to increased performance, MMX technology will free up additional processor cycles for other functions such as processing, audio and speech synthesis, compression, telephony, and 2D and 3D graphics.

From a gaming perspective, MMX will amp up MPEG video compression, texture mapping, and 2D filtering. Game companies such as Origin Systems, Bullfrog, id, and Electronic Arts have been working with Intel, attempting to take advantage of MMX technology in their upcoming titles.

Eric Klein, Director of New Business at Bungie Software says "that to take advantage of our new, and up-and-coming titles you'll need at least a Pentium 133. On an MMX-equipped machine, however, you'll be blown away."

Intel plans to ship the first MMX processor—the P55C—during the first quarter of 1997, followed closely by MMX-compatible offerings from Cyrix and Advanced Micro Devices. All three companies' chips vary slightly from each other. Because MMX enhancements require software-level support, Intel's chip features a dual MMX pipeline to decode or issue two MMX instructions per clock cycle, and has a level one cache of 32K. Alternatively, both AMD's K6 and Cyrix's M2 have implemented 64K of level one cache.

By midsummer, we'll see the introduction of M2 from Cyrix. This new chip will retain the proven 6x86

Pure Power

PREVIEW

processor core, but will quadruple the size of the chip's level one cache to 64K—double that found in the P55C. It's expected to boast speeds of up to 250MHz and use an 83MHz bus for performance gains. The M2 is positioned to go up against Intel's updated 266MHz Pentium Pro chipset, Klamath, by midyear.

Klamath is rumored to improve support for 16-bit applications, a limitation that has stunted the Pentium Pro's success on the Windows 95 platform. By the end of 1997, Intel hopes to ship Deschutes, the Pentium 300MHZ P6 named after a river in Oregon. Then in early 1998, the company is expected to ship Katmai; and after that the Willamette, another revision of the Intel family. In addition to these development plans, Hewlett-Packard and Intel are already collaborating on the next generation P7, known as Merced, which is scheduled to ship in the last quarter of 1998.

It's expected that the P55C processor will be integrated into the majority of new home systems running Win95, while the Klamath will be integrated into business and NT environments. Still, don't count out Cyrix as a worthy competitor. The current Cyrix chip is already M2 pin compatible. This means that anyone already owning a machine with Cyrix inside, can upgrade to the M2. Pentium owners (Pentium Pro owners excluded) will need to purchase a whole new motherboard, or clamp on an OverDrive chip (voltage requirements allowing), in order to upgrade.

USB comes home

Universal Serial Bus (USB) will ship with new systems from Compaq, NEC, Micron, Gateway, Dell, Toshiba, and others. This new connectivity standard will make plug-and-play a reality, replacing the RS-232, game, keyboard, and mouse ports. USB configures itself dynamically and allows hot swapping of peripherals without powering down your PC, and will allow you to connect up to 127 devices from a single connector, and free your desk of tangled cables.

The trickle of USB products has already begun. So far, Alps is the only company to have introduced a USB-compatible 14-button gamepad and keyboard; but by midsummer expect a USB mouse, keyboard, and game

Preview Perspectives: Paul Collas

Desktop Product Line Manager **Gateway 2000**

Gateway feels MMX technology will enhance the processor architecture and create a noticeable difference, once software supporting the instruction set comes out. Without paying more, from a consumer standpoint, MMX-enhanced software will see a performance boost from 10 to 15 percent. There won't be a ton of software that'll take advantage of MMX right out of the chute, but once the software support is there, there will be significant advantages.

DVD is scheduled for 1997 and will have a large impact. Not so much from a volume standpoint, but certainly from a technology standpoint. It'll give a clear direction as to where the market is going. My feeling is DVD will hit stride sometime in 1998, but we're evaluating putting DVD-ROMs in our machines in 1997.

We're supportive of USB technology. Right now, we're looking at it for the first quarter of '97. Part of our decision will be based the development of USB peripherals. It's not a question of *whether* USB will happen, the question is *when*. It's kind of a chicken-and-egg scenario. USB peripherals will slowly start happening in the first half of '97.

We're rapidly moving toward adopting 3D accelerator technology across our entire product line; and to that end, we're working with all the major vendors, including S3, ATI, and Matrox. We feel 3D provides added functionality, without increased cost to the consumer. 3D accelerator technology will definitely be a check-off item in 1997.

The current Destination system [Gateway's entry into the PC/TV market] is a first-generation product, and while it's a good value, I think what you're going to see in the coming year is the evolution of that product to include: added functionality, ease of use, aesthetics, and affordable cost. This gradual evolution will bring the Destination closer to the masses.

There have been requests for a pure gaming machine, and we're looking at putting together a bundle specifically for that. From a product standpoint, we certainly have a very, very robust platform for it. If you look at PC games and the wants of a PC gamer, we have the hardware to support them, but currently we do not have plans to put together a game platform.

My personal opinion on the Internet, barring infrastructure issues, is that it's where everything is moving toward. But there's still a lot of work to be done.

Look at our history. We have obviously been in a position, from our direct business model, to take advantage of the latest technologies. If it's available and feasible from a customer standpoint, and it's a good value, we'll consider it.

Added functionality, **ease** of use, **aesthetics**, and **affordable** cost. This **evolution** will bring the **Destination** closer to the **masses**.

Preview Perspectives: Mike Reed

Product Line Manager **Diamond Multimedia**

A variety of technologies will impact the PC in 1997, but with regard to communication technology, the driving factor is speed. We expect 56Kbps to be big in '97; and we expect to be one of the first companies to deliver 56Kbps modems to the marketplace. We're currently using the Rockwell modem technology; however, but we have our own R&D resources, so we can be silicon independent, if needed.

Our major focus in '97 is Internet multimedia. Our graphics division is very good at accelerating graphics and we have built our company on that competency. We're targeting 1997 for our USB products. USB gives us an opportunity to put a variety of communication technologies into the modem, features beyond just communications capabilities. With USB peripherals, we can start to enhance the actual modem itself, by adding telephony capability, dial-in, and fax storage.

USB will help our OEM customers add external modems to their products, allowing them to tailor specific modems to specific customer orders, as opposed to one modem for an entire PC line. This will give our OEMs, and our consumers, an advantage. USB lets us integrate power features into the product as well.

MMX will give us an opportunity to introduce modem technology to the Pentium processor, allowing us to feature software upgradability in our modems. Taking the expense of silicon out of our own products will give us the opportunity to reduce the cost of our modems, while still delivering all of the features of a hardware-based modem.

DVD is very important to both us and to our customers. DVD provides dramatically more storage than CD-ROMs and promises to deliver much more interactivity and more graphics.

In the consumer market, the Internet will only continue to grow. More and more people are getting on the Internet, creating a greater demand for faster modems. So far, we've been able to satisfy that demand with the 33.6Kbps modem, but we expect the Internet to impact demand for our 56Kbps technology in 1997 as well.

People are thirsty for answers, and the Internet has an endless amount of information. The ability to display this information in a graphical, intuitive interface will help satisfy the demand for information.

With regard to **communication** technology, the driving factor is **speed**. We expect **56Kbps** to be **big** in '97.

controller from Microsoft. Other companies that have announced USB devices include: Logitech, which plans to produce a USB mouse and joystick; and Cherry, with three USB keyboards, one of which will include a built-in flash-card reader.

The USB connector is a flat four-pin bidirectional connectivity standard that provides approximately the same bandwidth as an Ethernet connection (12MB per second). Intel—along with Microsoft—are determined to make USB *the* connectivity standard in 1997, and most, if not all PC motherboards shipping this year will include at least two USB ports.

If a new system isn't in your budget this year, don't despair. USB PCI expansion cards will be available for your current system. Just make sure the system you buy today has enough open PCI slots for the upgrade. And companies such as Alps are committed to producing USB hubs, which will consume one USB port to provide up to six additional USB ports.

That's fire in that wire

The IEEE-1394 High Performance Serial Bus has been in development for more than 10 years. FireWire bus technology is a very complex serial bus protocol that multiplexes a variety of digital signals such as compressed video, digitized audio, MIDI, and device-control commands.

More than 60 companies are actively supporting FireWire, including AT&T, Sony, Philips, Microsoft, and Intel. The advantage of FireWire is that it accommodates different data types and topologies better than alternative networking systems. Like Ethernet and other high-speed digital data transmission systems, FireWire is a layered transport system. The IEEE-1394 standard defines three layers: Physical, Link, and Transaction. The Physical layer provides the signals required by FireWire bus. The Link layer takes the raw data from the Physical layer and formats it into recognizable 1394 packets, then presents them to the application. The Transaction layer takes the packets from the Link layer and presents them to the application. FireWire can support up to 63 devices on a single bus, and allows transfer rates of up to 400 megabits per second. USB, in comparison, is a much slower architecture, with top speeds of 12 megabits per second, but is far cheaper to implement than FireWire.

3D technology rages on

When it comes to bleeding-edge technology, it's apparent what's pushing the envelope. It isn't spreadsheets, it isn't word processors, and it isn't the Internet. It's games!

In 1996, we saw second and third generation video cards and technology, but the next generation of video hard-

Pure Power

PREVIEW

ware is adding new realism to games and applications. New 3D accelerator cards and 3D chip technologies are being announced each month and are migrating onto new desktop machines from Compaq, IBM, AST, HP, and NEC. And thanks to the release of the Direct3D API, 3D accelerators are poised to become 1997's hottest commodity.

But the 3D graphics market is still undefined. More than 30 competitors are jockeying for position. S3, the leading supplier of graphic chips to OEMs, entered the market with the ViRGE chipset that is currently in use by Diamond and AST. Not to be outdone, ATI has introduced its second generation of 3D video accelerator technology—the Rage 3D II chipset on ATI's own 3D Expression line of accelerators. The Rage 3D II has full support for Direct3D and supports alpha blending, Gouraud shading, and more.

Rendition's Vérité chipset has also stirred up some heat in the 3D wars, especially since Microsoft is using the chipset as the hardware reference platform for Direct3D. The Vérité chipset supports perspective correction, texture mapping, bilinear filtering, antialiasing, true color, Z-buffering, and fogging. Creative Labs' 3D Blaster PCI is based on Rendition's Vérité 3D chipset, as are Sierra's Screamin' 3D and Intergraph's Reactor cards.

NEC and Video Logic's PowerVR chipset is expected to ship soon. The PowerVR chip doesn't use Z-buffering memory, instead handling the hidden-surface removal with the Image Synthesis Processor that's integrated into the chip. Compaq is using the PowerVR chip in its Presario 8710 computer.

Instead of using its own PowerVR chip, NEC's PowerPlayer 2020 desktop system uses the 3Dfx Interactive Voodoo Graphics chipset, and Diamond Multimedia is using the Voodoo chip in its Monster 3D accelerator.

Again, Microsoft plays a role in how the 3D wars will shake out. The big M's delays in releasing Direct3D were a nightmare for game developers, who were forced to choose which cards to support. Unfortunately, the victor may not be the company with the best card, but the company with the best drivers.

The future of DVD

There was a time when you could crack the shrink wrap of the hottest new PC game and find a single floppy disk. The classic games and programs that are the foundation of the home computer revolution shipped on 5.25-inch floppies. Well, those days are over. As programs have grown increasingly complex and media-rich, double-digit floppy disk installations have given way to convenient CD-ROMs and single-speed CD-ROM drives. It didn't take long for multidisc games to make the scene, and 1996 saw more than a few such titles (but few that actually warranted the hassle). In 1997, CD-ROM drives may finally yield and give way to Digital Versatile Discs (DVD-ROM). Or not.

DVD-ROM will bring a whole new dimension in video and sound to your PC, and will allow you to play full-length movies on your computer. DVD's data-transfer rate is substantially greater than a CD-ROM drive (4.69MB per second vs. the 1.6MB rate of a 12x CD-ROM). DVD-ROM drives will feature AC3 audio (six-channel digital audio) and MPEG2 (broadcast video) compatibility. The new digital format is the same as that used by Digital Satellite Systems (DSS) and has a resolution of 720 horizontal pixels and 480 vertical lines. The new format will display a much sharper image than current laserdisc players, but is backward compatible with traditional CD-ROM discs. And unlike

Preview Perspectives: Steve Aanderud

President and CEO, ThrustMaster

The enhancements to Win95, including support for USB and Direct X, will play a key role in the coming year. While DVD, digital cameras, and online multiplayer gaming are very important, PC manufacturers will continue to position the computer as a mainstream entertainment product—as evidenced by the introduction of large-screen TV/PC systems and user-friendly interactive multimedia systems.

Our focus in 1997 is on advanced features, exceptional quality, and great pricing. We have new products in development that we believe gamers will want for that competitive edge, including 3D controllers, force feedback technology, and real plug-and-play devices.

Long term, we're envisioning the Holodeck experience. With speed enhancements, 3D rendering, spatial sound, and other haptic inputs game and entertainment performance in '97 and the next few years will be a very appealing world. Gaming is becoming a 3D world.

With **speed** enhancements, **3D** rendering, spatial **sound**, and other haptic **inputs** game and entertainment **performance** in '97 and the next few years will be a very appealing world..

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Power PREVIEW

CD-ROMs, with a maximum storage capacity of 630MB, DVD-ROMs can store a whopping 4.7GB.

Hardware manufacturers are excited about DVD, because the introduction of such a powerful technology will drive many consumers to buy a whole new system. IBM, Compaq, Sony, Toshiba, and NEC are all planning to ship DVD-ROM systems in 1997. And Activision has announced plans to remaster DVD versions of *Muppet Treasure Island*, *Spycraft* and *Zork Nemesis* by midsummer. However, the biggest drawback is the lead time required for developers to produce titles for the new format.

Hardware manufacturers are excited about DVD because the introduction of such powerful technology will drive many consumers to buy a whole new system.

During the last couple of years, CD-ROM titles that were basically just cheap full-motion video clips with a couple of puzzles and mouse trolls thrown in for good measure flooded the shelves. Gift wrapped in pretty boxes, they were sold by skillful marketing for $49 a pop. The inherent problem with DVD is that these same companies can now shoot even more video footage, add a soundtrack with Dolby audio capabilities, and call it a game. Hopefully developers will embrace the DVD format and technology, and produce titles worthy of that format.

Unfortunately DVD is on a holding pattern right now—at least until copyright issues can be resolved. Regardless, both Sony and Philips have already begun to license their DVD patents to various third parties. But in the meantime, DVD backers such as Toshiba and Sony are still committed to producing 12x and 16x CD-ROM drives.

Windows? Memphis? Cairo? Nashville?

Win95 has already seen several changes since it first shipped one year ago. The current OEM version of Win95 (OSR 2) shipped in November of 1996 and included changes in the file system, Internet Explorer 3.0, Internet mail and news, power management and multimedia drivers, and additions of new hardware drivers. The new version also included a new FAT32 file system that could handle disk partitions larger than 2GB. In 1997, look for Microsoft to make significant changes to Win95 in an attempt to unify it with Windows NT.

The next version of Win95 (code name: Memphis) isn't expected until late 1997, and will require at least 16MB of RAM. Memphis will be the first version of Windows that won't include DOS configuration or boot code, and will encompass some of NT's kernel. Microsoft has worked with developers to create a single Win32 API to unify NT and Win95.

The 4.0 version of Explorer (code name: Nashville) is expected Q1 of '97 and will feature tight integration with the Windows OS, offering hypertext access to file systems, and near seamless access to the Internet.

Cairo, the next upgrade of NT, is slated to arrive with Memphis, and will deliver the remainder of DirectX APIs to NT. A new object-oriented file system makes Cairo a big D. Look for it in 1998.

Microsoft is also set to launch Windows CE (code name: Pegasus), an entirely new portable operating system built to work with a new range of hand-held PCs and wireless communication devices. Pegasus extends

Preview Perspectives: Glenn Schuster

Director of Marketing **S3**

The evolution of 3D graphics will be the single most important factor in 1997. It represents a major application and user interface change for the PC.

We spend a lot of time with the Intel folks to balance what we do in hardware with what they're doing on the processor side. MMX will be fairly significant and the major area of MMX impact is really going to be the enhancing of DSP-centric algorithms, and upping the baseline for communications and audio specifically.

MMX will only have a minor impact on PC gaming. There will be some enhancements in geometry processing, and this will enhance 3D a little. But MMX certainly doesn't replace acceleration. If you look at the enhanced titles for 3D accelerators available so far, the levels of 3D rendering required are far above what MMX can possibly do in software.

The evolution of 3D graphics will be the single most important factor in 1997.

Once they hammer out the copyright protection issues, we expect DVD to hit in '97. We don't expect DVD to overtake CD-ROM, but you'll see crossover in 1998, when DVD begins to become dominant and people really start talking about it.

USB is certainly not taking off as quickly as expected, but we do see it becoming a baseline requirement for systems moving forward. The real question however, is: When do volume peripherals really jump on the USB? We don't expect that to happen until late '97.

Microsoft's vision of information at your fingertips, beyond the desktop and notebook PCs we know today. More than 40 software and hardware companies are currently designing products for this new platform.

Change scares some people, but the PC would die without it. Today's computers are capable of astounding feats, but look no further than any episode of *Star Trek Voyager* to see how much better PCs could be.

Expect some bumps in the road as we fly down the techno highway toward the millennium, but all the lights are green and the speed limit just keeps getting higher. And every time programmers redline existing technology, the hardware engineers in the pit crew manage to come up with a bigger engine, faster tires, or more potent fuel.

Sure, 1996 was good, but 1997 is going to blow you away. ■

Preview Perspectives: Michael Rubin

Director of Product Marketing **Compaq**

The most important technologies that we'll see in 1997 are those that increase the interactivity experience of PCs in the home. MMX technology, DVD, and 3D acceleration will transform the PC into a much more interactive system.

Because MMX has a built-in external cache for optimized performance, it increases the speed of the system. Right now, we're seeing around a 20 percent performance increase with that added cache. And with software optimized for MMX instruction, consumers will see increased performance and other breakthroughs.

The customer will definitely see tangible benefits through the MMX technology. We strongly believe that.

USB technology will allow consumers to easily add peripherals to their system. From a gaming perspective, it also allows for peripheral with extra functionality, such as controlling both analog and digital devices. The delay in delivering USB is the old chicken-and-egg scenario. Microsoft is responsible for delivering the drivers that enable this technology, but on the other hand, Microsoft requires a robust set of hardware devices to test with, in order to deliver the driver class technology for the entire industry. More importantly, Microsoft is providing USB support for all future releases of the Windows operating system.

We are currently aggressively working with Microsoft to understand how we can take care of our current customers before the release of Memphis [the first retail Windows OS that will support USB]. The complexities involved in upgrading a system from OSR1 to OSR2 are some of the reasons why Microsoft is putting it off until Memphis. In the meantime, we're trying to encourage USB manufacturers to provide not only a USB class driver, but also a VXD driver that'll work under any version of Windows. Overall, USB is a good solution for the consumer.

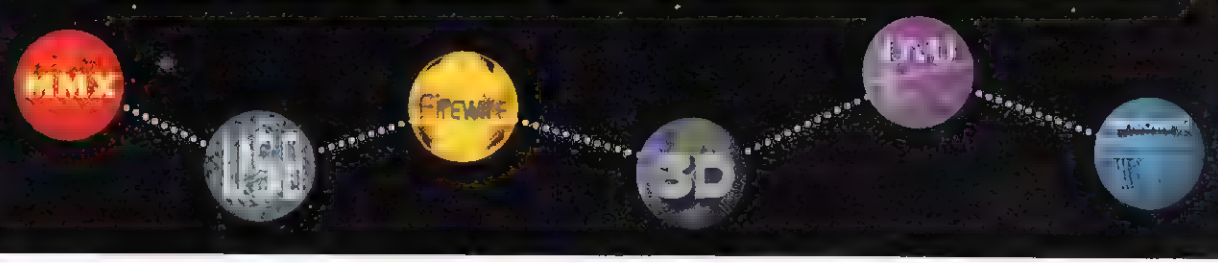
We are working on the Device Bay specification with Intel and Microsoft, and are still trying to actively work between the companies to decide what the software plan is for rolling out that technology. We'll be disclosing more information on this new specification soon.

The one key technology that Microsoft *is* providing in 1997, is their Direct3D technology. As we move into '97, board manufacturers and companies such as Compaq will choose those technologies that deliver the best performance, or price performance. Once we have a girth of good, solid titles supporting Direct3D, who will win the 3D accelerator card war becomes less of an issue. The further we move into 1997, the more important Direct3D is going to become, and the more important it's going to be to have a system equipped with a very good 3D accelerator.

DVD is another technology that will become increasingly important as we move farther into 1997. It has tremendous promise. The interspersing of really rich 3D with full-motion video, and the ability to store tremendous amounts of content, has considerable promise. Compaq believes we'll see this content finally delivered in '97.

Ultimately, Compaq will continue to push the envelope and provide a computing solution that is easy to use, intuitive, and as interactive as possible. We are committed to integrating new technologies into our systems as long as they deliver benefits to our customers.

> With software optimized for **MMX** instruction, consumers will see **increased** performance and other **breakthroughs** in applications they couldn't do before on a **PC**.



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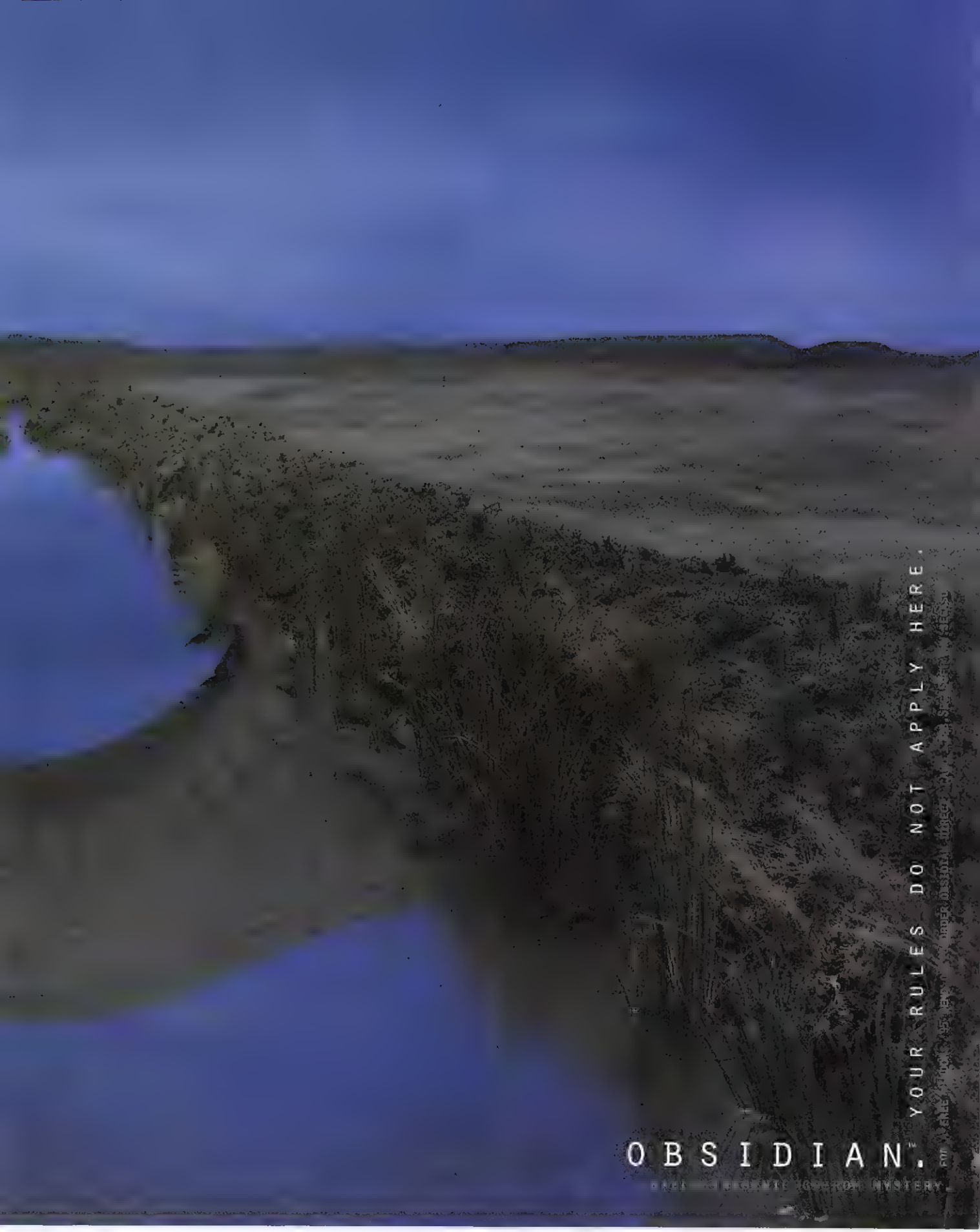

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Product Information Number 302

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OBSIDIAN

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DEALING WITH YOUR PC **OBSESSION** DAY TO DAY BY BREAKING IT DOWN INTO 12 **EASY** STEPS

this month:

Overclocking Your CPU

Inexperienced users: READ NO FURTHER! You're about to learn an ancient art practiced by those obsessed with pushing their machines to the absolute limit. If you shudder at the thought of cracking your case: READ NO FURTHER! What you learn here will either damn you or free you. As with all black arts, there are prices that *must* be paid—the larger the benefit, the larger the price. Why risk damnation? One word: SPEED.

If you've ignored these warnings, welcome to the brotherhood of the obsessed. It's time to find out how much your system can take. Others would simply buy a faster CPU. This could satisfy you temporarily, but when MMX comes out this January you'll be jonesing for more. Pushing your existing CPU gives you more time to save for a truly faster replacement. Let *boot* guide you through the shadows of this foreboding practice in 12 easy steps.

—Sean Cleveland

1 Understand What You're Doing

Overclocking, or **speed-margining**, is the process of pushing a CPU beyond the speeds originally intended by the manufacturer. Rumors abound of how chip manufacturers conservatively rate their CPUs, filling orders with lower marked chips due to overstocking of higher-rated chips. You may be one of the lucky ones.

Many have successfully pushed their 486SX or DX-33 to 40MHz or their Pentium 75 to 90MHz or even 100MHz. Some have dared to push their Pentium 133 to 166MHz or their 166MHz to 200!

This peltier CPU fan made by Dude! Computer Products has an alarm buzzer that warns you when your CPU is overheating. (3)

2 Know the Ramifications

It is NOT recommended that you attempt overclocking if you work with sensitive or vitally important data, since you could experience subtle problems, such as floating point calculations being slightly off. If stability's your gig, then mucking with your system's clock isn't wise.

NEVER overclock a CPU on a motherboard not spec'd to operate at the speeds you're shooting for, even if it seems to let you. The components may not be up to the required standards.

Another risk goes by the scientific name of **electromigration**. This has to do with the amount of current (electrons) passing through the microscopic lines on the chip and the amount of heat generated in the process. Electromigration increases when overclocking and leads to a higher potential for irrevocable damage. It's very much like forming new neural pathways in your brain. When you apply this method to chips you end up with a short circuit.

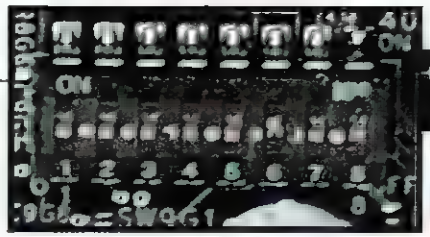
3 Keep Your Cool

The biggest threat to the survival of your CPU is heat. And overclocking creates heat. Don't attempt to do this without protection, and unfortunately, the type you need here can't be attained from your local drug store. What we're talking about here is a fan and a heat sink. The heat sink pulls heat away from the CPU and the fan dissipates it. Heat-sink compound also provides an efficient conduit. These all work together to prevent your CPU from turning into a molten pile of silicon.

The Peltier Cooler is by far the best option. Peltier active coolers take advantage of the "Peltier thermoelectric effect" in which current through a strip of dissimilar metals causes heat to move from one surface of the strip to the other. From there, the heat is transferred to the heat sink and on to the air circulated by a fan. Unlike standard heat sinks and fans, Peltier active coolers can lower temperatures below ambient conditions, acting like miniature electronic refrigerators.

If this seems like overkill, consider a ball-bearing fan, which will run smoother, longer, and more importantly, quieter than their standard counterparts.

(3) With these chilling your system you can use your case to transport organs for transplant.



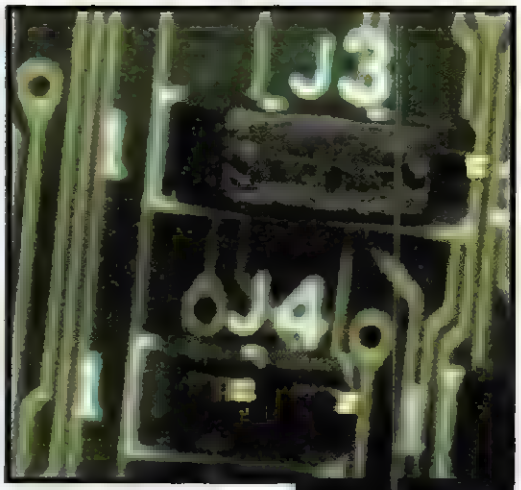
④ Some motherboards like the Endeavor pictured, use switch boxes instead of jumpers.

4 Know Where You Are

Don't forget to ground yourself when working inside your computer. Static electricity can kill your motherboard, or other electronic equipment you may accidentally touch inside your case.

It's time to meet your friend: the **jumper.** Jumpers are usually numbered on the motherboard and have the letter 'J' in front of them (J43 would be jumper #43). It's best to find the jumper's position in your motherboard's manual first (you could go blind, inadvertently knock a wire loose, or break something poking around trying to find them directly on the motherboard).

Motherboard jumpers are normally in two to three pin configurations. Two pinned jumpers are closed when the jumper block is on the pins, and open when it's off. Three pinned jumpers can be either open, or need the jumper block to be on pins 1 and 2, or 2 and 3. The motherboard's manual will tell you where to move the jumper block to cover the necessary pins. Pin #1 is usually noted in the manual and marked directly on the motherboard with a '1' or a small arrow next to the designated pin.



④ Placing a jumper block on J4 will not only close it, but will sink your opponent's battleship as well.

5 All the Flavors of 486

There are various different types of 486 CPUs. Most notably: the SX, SX2, DX, DX2, DX4, and Pentium Overdrive chips. The 486 CPU uses an external data bus for communicating with it and the motherboard as well as an internal data bus for its own operations. Both are 32-bit bus types. The external data bus runs at 33MHz, the internal at the clock speed designated by the CPU. The SX and DX run internally and externally at 33MHz. The DX is an SX with a math coprocessor (which a lot of today's games and graphics apps require) and an internal cache. The SX2 and DX2 chips run twice as fast internally and the DX4 runs at three times the speed (The name is just a fancy marketing ploy.) The DX2 chips use a technology that takes the external speed of 33MHz and doubles it for its internal workings.

What does all this rigamarole mean? You can't take a regular 486DX-33 chip and turn it into a 486DX2-66. You can however, increase its speed in other, more salient, ways.

6 Pushin' a 486

Changing the jumpers on the motherboard to a higher speed setting is the simplest way to clock up your CPU. Locate the jumper(s) that control the motherboard's clock speed. (Again checking the motherboard's manual.) When you find these, WRITE DOWN YOUR CURRENT SETTINGS. You'll be glad you did just in case this doesn't work. Carefully move the jumper(s), increasing it to its next higher speed. For example, if it was set to 33, try 40. If it was set to 50, try 66.

If your board doesn't support this, then you will have to change the clock crystal to speed it up. THIS IS NOT RECOMMENDED. Those who ignore this recommendation (and have the technical know-how to safely pull it off) will need a soldering iron, a new crystal, and nerves of steel.

7 Pentiums Like it Like That

Pentium chips usually overclock better than 486s and are generally easier to push, since they run at a different clock speed internally than they do externally. The external speed is used for the cache and main memory and is divided by two for the PCI bus. There are three different external clock speeds: 50MHz, 60MHz, and 66MHz.

8 Strainin' a Pentium

If you own a P75, P90, P120, P150, or even a P166, just changing the clock speed to either 60MHz or 66MHz will significantly impact benchmarks. If it doesn't, try bumping up the multiplier a step from 1.5 to 2 or from 2 to 2.5. Follow the chart to find the best speed increase.

CPU	MEMORY SPEED	MULTIPLIER	PCI SPEED	MULTIPLIER
Pentium 60	60MHz	1x	30MHz	2x
Pentium 66	66MHz	1x	30MHz	2x
Pentium 75	50MHz	1.5x	25MHz	3x
Pentium 90	60MHz	1.5x	33MHz	3x
Pentium 100	66MHz	1.5x	33MHz	3x
Pentium 120	60MHz	2x	30MHz	4x
Pentium 133	66MHz	2x	33MHz	4x
Pentium 150	60MHz	2.5x	30MHz	5x
Pentium 166	66MHz	2.5x	33MHz	5x
Pentium 200	66MHz	3x	33MHz	6x

⑧ Use this chart to find the appropriate speed to shoot for when pushing your CPU.

As soon as you find the "Any" key you can power down your system and change back to your motherboard's original settings. (11)

11 Know your Limitations

As with anything pushed past its recommended limits, there are bound to be problems. You're attempting an experiment, treading into a dark area few dare to enter. Your CPU may be running fine but your other equipment may not be up to the challenge. Video cards, disk controllers, memory, or even your motherboard may not function correctly under such a heavy load. Some video cards do not operate at high speeds, memory may not have enough time to complete tasks or there might be cheap components on the motherboard itself that prevent success. Try decreasing the bus speeds; increasing memory wait states; or slowing the memory speed down—your manual should explain how to do this all. You may want to just invest in faster equipment or even a faster CPU. Hey, you gave it your best shot, hopefully the powers below won't be too harsh on your soul.

12 Midnight: Time's Up

You've spent all day digging in the entrails of your system, moving little pieces of plastic back and forth. If you have not successfully pushed your CPU by now, you are most likely grasping at straws. Give it up, go to bed and dream about the next generation of CPUs.

Try it out! demo on the bootDisc

SysChk
Provides valuable details on everything from your CMOS version to details on devices installed in your system.

10 Push it Harder!

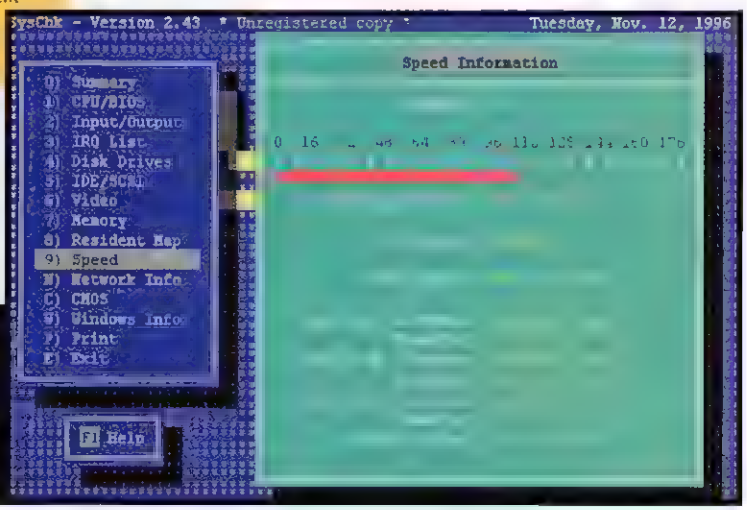
OK, test it. A shareware version of a DOS-based utility called *SysChk* has been included on this month's bootDisc and can be used to benchmark the speed of your CPU.

Win95 is a good place to test your newfound speed as it seems more perceptive to subtle changes, either through its enhanced architecture and high-performance tuning or, more realistically, the haphazard fashion in which its 32-bit internals have been stuck together with saliva. Either way, it's a good operating system to test with. Any DOS4GW game, such as *Doom*, *Descent*, or *Quake*, is also a good test, as these tend to tax your CPU. Errors to look for: random lockups and hangs, intermittent reboots, page faults, and invalid op-code errors. If it works, push it harder.

The goal here is to get the most speed out of your machine. If it craps out, you need only set it back to the original settings or those of the last successfully tested speed.

9 Gambling with Silicon Chips

When changing the CPU speed settings, keep in mind that you are also changing the speed value of the memory and PCI bus. The most stable clock speed is 66MHz. If you change from a 133MHz to 150MHz, your CPU will be running faster internally but your memory will be running at 60MHz and your PCI bus at 30MHz. Memory access will be slower. Those gains may not be worth the drain on your CPU. But if you can get that baby to work at 150MHz, you'll save yourself a nice chunk of upgrade change.



(10) *SysChk* is a handy benchmarking and system diagnostic utility that'll tell you just how fast your system really is.

boot worthy

EACH MONTH, **BOOT** EDITORS COMPILE THE BEST **PRODUCTS** IN A SPECIFIC CATEGORY AND DEEM THEM: BOOT**WORTHY**

this month:

High-end Monitors

If you've never gamed on a 21-incher, you haven't lived. If you're putting together the ultimate desktop system, you'd better include one of these bad boys on your shopping list. Fortunately for your bank account, the prices of big-screen displays have dropped considerably over the past couple of years. Models that previously cost as much as a small car now range from $1,600 to $2,100. That's still not cheap, but the return on your investment will certainly stimulate your saliva glands. With all that space, you can see a full page of your web site on one side of the screen, and all the related HTML code displayed on the other. You can enlarge your *Lightwave 3D* model to gargantuan proportions, so you can fine-tune the most minute detail without straining your eyes. Creatures in games look real enough and big enough to bust through the glass and boogie on your desktop. Even the ant-sized soldiers in games like *Z* and *Close Combat* take on realistic proportions. Like the old beer commercial says, "You only go around once in life. Why not go for the gusto!"

— *Michael Brown*

ViewSonic P815

PRICE: $1,995
TUBE: Invar Shadow Mask
DOT PITCH: 0.25mm
MAX RES: 1800x1440
REFRESH RATE: 76Hz
COMPANY: ViewSonic
PHONE: 800.888.8583
URL: www.viewsonic.com

For some people, it's an aperture-grille monitor or nothing. But the specs on ViewSonic's P815 will turn even the bluest nose green with envy.

The P815's 21-inch invar shadow mask tube (20-inch viewable area) has 250MHz of bandwidth, so it's capable of a maximum resolution of 1800x1440 pixels with a refresh rate of 76Hz. And at 1600x1200, it's capable of an amazing 91Hz refresh rate.

This puppy has a fine dot pitch, too; just 0.25mm. In short, no monitor on the market boasts higher specs.

Crank the brightness and it'll drive you out of the room. The display is incredibly bright and color reproduction is very accurate. ViewSonic's ARAG anti-reflection, anti-glare coating helps to refract light away from the face of the monitor, so you don't end up staring into a 20-inch mirror.

Resolution/refresh rates:
640x480 at 160Hz
800x600 at 160Hz
1024x768 at 139Hz
1280x1024 at 106Hz
1600x1200 at 91 Hz
1600x1280 at 85Hz
1800x1440 at 76Hz

The OnView on-screen controls are logically arranged and accessed using four buttons mounted on the front panel. Adjustments can be made to 20 controls, including pincushion, trapezoid, parallelogram, and color matching. There are also controls for vertical and horizontal moiré.

With both 15-pin D-sub and BNC connectors on the back, you can use the display with two systems at the same time.

And for the health-conscious, the P815 complies with the Swedish TCO standard for reduced electromagnetic emissions.

If you're looking for the ultimate in resolution, nothing beats the ViewSonic P815.

How We Tested This Month's bootWorthy Monitors

We selected Matrox's Millennium MGA PowerDoc edition for testing these monitors. With the optional 6MB WRAM daughterboard attached, we were able to drive each display at 1600x1200 resolution with 24-bit color depth—the highest resolution currently supported by Win95. We also tested the ViewSonic P815 with the Millennium installed in an NT workstation, so we could check out that monitor's 1800x1440 mode.

— *M.B.*

Mitsubishi Diamond Pro 91TXM

PRICE: $1,699
TUBE: Aperture Grille
DOT PITCH: 0.28mm
MAX RES: 1600x1200
REFRESH RATE: 76Hz
COMPANY: Mitsubishi
PHONE: 800.843.2515
URL: www.mitsubishi-display.com

Mitsubishi del-
tech t

Resolution/refresh rates:
640x480 at 152Hz
800x600 at 150Hz
1024x768 at 118Hz
1280x1024 at 88Hz
1600x1200 at 76 Hz

Sony Multiscan 20se II

PRICE: $1,999
TUBE: Aperture Grille
DOT PITCH: 0.25mm
MAX RES: 1600x1200
REFRESH RATE: 75Hz
COMPANY: Sony Electronics
PHONE: 800.352.7669
URL: www.sony.com/technology

Sony has introduced a slew of new "value priced" monitors, but the "se II" series remains its top-of-the-line. Considering this 20-inch model (19-inch viewable area) costs $300 more than Mitsubishi's new 21-incher, you might be wondering "What gives?"

The price difference can be partially accounted for by what Sony refers to as the "Sony premium." The company has such a reputation for quality products that it can simply demand more, and buyers—particularly corporate buyers—will pony up the cash.

But it's not just corporate bragging rights that people pay for. Take a look at this monitor's grille pitch for example. At 0.25mm, that's as fine as any other manufacturer's offering.

The 20se II is exceptionally bright, and its

▶66

◀ 65 colors are true. The tube is coated with an anti-reflective material that minimizes glare without affecting brightness or clarity.

This is the only model we examined that had a button on the front panel for each of its controls. This feature is something of a double-edged sword: It makes it easy to make adjustments (you don't have to navigate through layers of menus), but it also makes it easy to accidentally change settings by bumping the buttons. (Locking the controls prevents this, but in a few months, you'll drive yourself nuts trying to figure out why you can't make adjustments.)

You'll find all the controls you'd expect, including pincushion, convergence, and moiré cancellation. Surprisingly, the monitor doesn't provide controls for trapezoidal and parallelogram adjustments.

Sony provides both BNC and 15-pin D-sub connections, and the display complies with the important TCO guidelines.

The 20se II is one of best monitors you can buy. You can't go wrong with this one.

Nanao FlexScan FX2-21

PRICE: $3,185
TUBE: Aperture Grille
DOT PITCH: 0.25 mm
MAX RES: 1600x1200
REFRESH RATE: 80Hz
COMPANY: Eizo Nanao Technologies
PHONE: 800.800.5202
URL: www.Eizo.co.jp/welcome

The FlexScan FX2-21 is one example of why.

Resolutions/refresh rates:
640x480 at 160Hz
800x600 at 160Hz
1024x768 at 130Hz
1280x1024 at 97Hz
1600x1200 at 80Hz

A Sixth Contender

We planned to include Nokia's new 445Xavc monitor in this month's bootWorthy, but the product didn't arrive in time for consideration. The 445Xavc packs a pair of stereo speakers, a subwoofer, and a video camera into its 21-inch aperture-grille display.

NEC Technologies P1150

PRICE: $2,079
TUBE DESIGN: Aperture Grille
DOT PITCH: 0.28mm
MAX. RES: 1600x1200
REFRESH RATE: 75Hz
COMPANY: NEC Technologies
PHONE: 800.632.4636
URL: www.nec.com

NEC's MultiSync P1150 is a behemoth, but it's a beautiful behemoth. This 21-inch display (19.6-inch viewable area) tilts the scales at a whopping 77.2 pounds; you'll need 22-plus inches of depth on your desktop to accommodate it.

The P1150's aperture grille tube has a respectable grille pitch of 0.28mm, and it's capable of displaying 1600x1200 pixels at a refresh rate of 75Hz. NEC's OptiClear screen surface ensures that ambient lighting won't mar the beauty of its display.

The P1150 was one of the brightest tubes we looked at, and its color fidelity was excellent thanks to NEC's AccuColor color-control system.

The controls on this monster are very well designed and intuitive. NEC has found the perfect balance of front-panel buttons—not too many and not too few. As soon as the item you need is displayed on

the screen, simply punch the "Proceed" button to select it. Controls are provided for pincushion, trapezoid, parallelogram, convergence, and more.

Like the other monitors we looked at, the P1150 complies with the MPR-II, EPA Energy Star, and NUTEK specifications for energy conservation and electromagnetic radiation. You'll need to install a filter (a $129 option) to achieve compliance with the stricter TCO-92 spec.

One feature the other monitors don't offer is a pop-up reminder to rest your eyes. At user-defined intervals, the monitor flashes this message on the screen: "Periodically rest your eyes by blinking often or looking away from the scene and focusing on a distant object." Friendly, ain't it?

The P1150's a beauty, just make sure your desk can handle it.

bootWorthy Monitors

MANUFACTURER	MODEL	SIZE (INCHES)	VIEWING AREA (INCHES)	DESIGN	DOT/GRILLE PITCH	PRICE	SIZING	PINCUSHION	TRAPEZOIDAL	PARALLELOGRAM	ROTATION	CONVERGENCE	LINEARITY	MOIRÉ	COLOR
ViewSonic	P815	21.0	20.0	Shadow Mask	0.25	$1,995	YES	YES	YES	YES	YES	NO	NO	YES	
YESMitsubishi	Diamond Pro 91TXM	21.0	19.7	Aperture Grille	0.28	$1,699	YES	YES	YES	YES	YES	YES	NO	YES	YES
Sony	Multiscan 20se II	20.0	19.0	Aperture Grille	0.24	$1,999	YES	YES	NO	NO	YES	YES	NO	YES	YES
Nanao	FlexScan FX2-21	21.0	20.0	Aperture Grille	0.26	$3,185	YES	YES	YES	YES	YES	YES	NO	YES	YES
NEC	P1150	21.0	19.6	Aperture Grille	0.28	$2,079	YES	YES	YES	YES	YES	YES	YES	YES	YES

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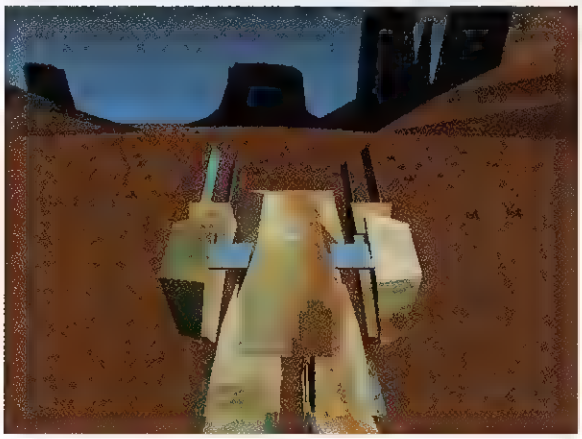

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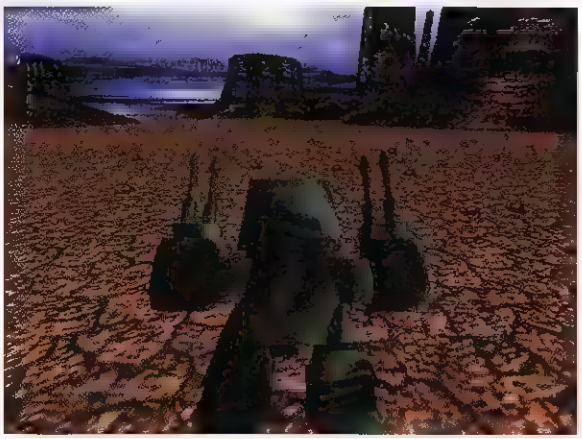

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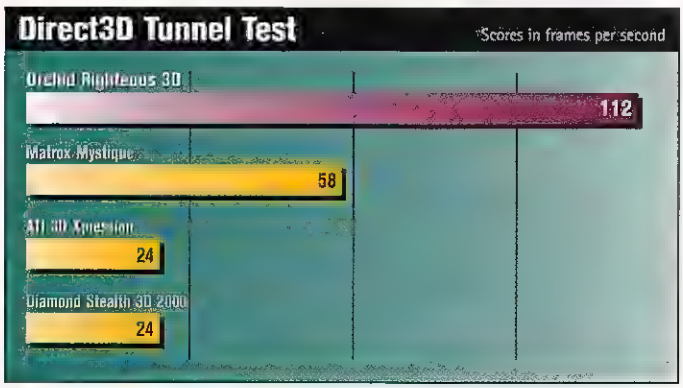

RIGHTEOUS 3D ORCHID

Product Information Number 236

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boot

previews

HARDWARE
ON THE HORIZON AND
SOFTWARE SOON TO SHIP

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H/W

With Sony's new GDB-W900 24-inch Trinitron monitor, you'll be able to fit two 8.5x11-inch pages, plus an assortment of toolbars on the same screen. The wide-angle display (with a 16:10 aspect ratio) will fit in the same footprint as Sony's 21-inch models.

Sony GDB-W900

The two-foot Trinitron

Sony is preparing to ship a super-wide display based on a new Trinitron tube. The GDB-W900 will feature a 24-inch tube (22.5-inch viewable area) in a chassis that has the same footprint as Sony's 21-inch model. With a 16:10 aspect ratio, you'll be able to view two entire 8.5x11-inch pages on screen, plus an assortment of toolbars, with no overlap.

Designers, web masters, animators, engineers, desktop publishers, and animators will find the GDB-W900 to be a useful tool. These professionals often use two monitors because they can't fit all the windows and toolbars they need on a single screen. "The biggest problem with using two monitors," says Sony marketing manager Michael Fox "is that it's nearly impossible to calibrate two different displays so that the colors appear exactly the same on both. The GDB-W900 solves that problem because it can display two monitors' worth of information on a single screen."

Due to the unusual aspect ratio, graphics card manufacturers will have to write custom drivers to support the display. The monitor will feature a maximum resolution of 1920x1200, at a non-interlaced refresh rate of 76Hz.

The new CRT uses a variable-pitch aperture grille, in which the aperture wires are spaced farther apart as they approach the edges of the screen. The monitor's pitch will range from 0.25mm at the center of the display to 0.29mm at the outside edge. Sony maintains that this design will enable the monitor to display sharp, accurate colors from the center of the display all the way to the very edge.

The company has also developed a new tungsten-impregnated cathode-ray gun that doubles the electron beam intensity while reducing the beam spot size from 0.43mm to 0.30mm. A new blue-color filter has been integrated into the beam's path to improve light transmission and increase contrast. The GDB-W900 will be Win95 Plug-and-Play compatible (DDC-2AB) and will comply with the International Energy Star, MPRII, NUTEK, and TCO '95 standards.

Artists won't be the only creative professionals interested in Sony's GDB-W900. Word on the street is that accountants are frothing at the mouth over the prospect of displaying 29 standard-width columns in their *Excel* spreadsheets.

— *Michael Brown*

product info

AVAILABLE: jan 97
PRICE: $4,995
COMPANY: Sony Electronics
PHONE: 800.352.7669
URL: www.sony.com/technology

Hitachi Mx Notebooks

That's Mx, not MMX

Don't be confused by the name; Hitachi's new Mx-Series of multimedia notebooks will be powered by standard 133MHz and 150MHz Pentium processors, not MMX chips.

With Intel's MMX processors just around the corner, Hitachi has decided to name its upcoming multimedia notebook computers the "Mx-Series," even though the computers will *not* be equipped with MMX chips. A Hitachi spokesperson said the name was chosen because these machines are an extension of the manufacturer's earlier M-Series. Coincidence? You make the call.

The Mx-Series will be powered by either 133MHz or 150MHz Pentiums with 256K of L2 cache. Memory will start at 16MB of EDO DRAM; expandable to 80MB. Continuing its focus on out-of-the-box communications, Hitachi is equipping the machines with a 33.6Kbps cellular-ready fax/modem, plus a 10Base-T Ethernet LAN port. Cellular-ready means you'll be able to plug your cell phone into the computer and use it to surf the web, or send faxes or e-mail wherever cellular service is available.

Video will be handled by a 64-bit SVGA chipset augmented by 2MB of VRAM. Video resolution will be 800x600 with 16-bit color depth, delivered to a 12.1-inch active-matrix display. Storage options will include removable hard drives (either 1.35GB or 2.0GB) and 8x CD-ROM drives. You'll have to swap the CD-ROM drive to use the floppy, but you'll also have the option of plugging a second lithium-ion battery into that bay. There will also be card slots for two Type II PCMCIA cards or one Type III card. One slot will be equipped with a Zoomed Video Port.

If you're looking for a desktop replacement, Hitachi will offer a port replicator and a minidock station that will include an IrDA-compliant infrared transceiver for wireless data transfer and a set of stereo audio jacks. The minidock is also compatible with Hitachi's earlier E-Series notebooks. Pricing for the port replicator and minidock had not been set at press time.

With the Mx-Series, Hitachi will be among the first notebook manufacturers to offer wavetable sound instead of FM synthesis. The series will also feature side-ported Altec Lansing stereo speakers, so sound won't be muffled by your hands while you work, and when you close the lid the speakers' performance isn't affected.

This new series of machines looks promising on paper; and according to a Hitachi spokesperson, pricing will be "in line with other high-end, full-featured notebooks," .

— M.B.

product info

AVAILABLE: jan 97
PRICE: TBA
COMPANY: Hitachi PC
PHONE: 800.555.6820
URL: www.hitachipc.com

Yamaha MU10 Tone Generator

Notebooks finally get great sound

Yamaha's MU10 Tone Generator packs 676 wavetable instruments, 21 drum kits, and a digital-audio effects module into a package the size of a video cassette.

Yamaha is packing its awesome XG MIDI instrument sample set into a battery-powered module the size of a VHS videocassette. Plug the device into a notebook's serial port and you'll gain instant access to the XG library's 676 wavetable instruments and 21 drum kits.

Modeled after Yamaha's WaveForce series of sound cards, the MU10 will feature 4MB of sounds in ROM. The device's extensive digital signal processing (including reverb, echo, chorus, distortion, delay, and flange) affects both MIDI data and external sources that are fed through its dual analog/digital audio inputs. If you're planning a late-night karaoke session in the boardroom, you'll be able to apply studio-quality reverb to mask your caterwauling vocals.

Yamaha MU10 Tone Generator Specs

Tone Generator	Wavetable
Sample set	4MB in ROM
Voices	676 wavetable instruments, plus 21 drum kits
Polyphony	32 notes maximum
Multitimbral	16 parts with dynamic voice allocation
Audio effects	11 reverb types, 11 chorus types, 43 variations
Controls	2 input volume controls, Host select switch (MIDI/PC-1/PC-2)
Jacks/Terminals	2 1/4-inch input jacks (mono), 1/8-inch line/headphone out (stereo), to Host terminal, MIDI In computer interface RS-232C, RS-422
Dimensions	7.4x4.1x1.4 inches

The MU10 will feature 32-note polyphony with 16-part dynamic multitimbrality so it will be able to play 16 instruments simultaneously. As soon as an instrument stops sounding, it will surrender its place in the queue to another instrument, delivering the impression that many more instruments are in the arrangement. The box will also function as a MIDI interface with MIDI in and out jacks so it can control other MIDI devices.

Yamaha's previous implementations of the XG sound library—in products ranging from its professional keyboard synths to its Disklavier player acoustic piano—have boasted sound quality rivaling a compact disc. If Yamaha is able to deliver that same sound quality in the MU10, you'll never settle for skanky FM synthesis again.

— M.B.

product info

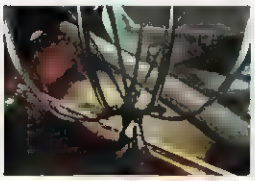
AVAILABLE: second quarter 97
PRICE: $249
COMPANY: Yamaha
PHONE: 800.823.6414
URL: www.yamaha.com

MDK

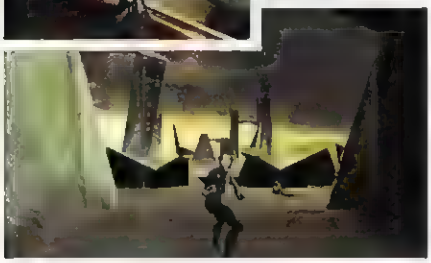
Murder, Death, Kill?

See it! preview on the bootDisc

The meaning of the acronym *MDK* remains undefined, but this highly anticipated title is certainly one of the slickest games we've seen. Earth has been overwhelmed by floating alien cities, and you must free fall from orbit in a specially equipped attack suit to kick some ass. Once on the ground it's 3D violence all the way.



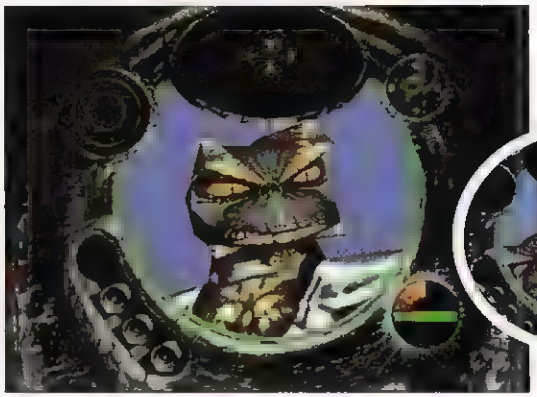
Kurt's ribbon parachute eases his fall from orbit.



MDK features plenty of vast open space.

The camera usually follows your character, Kurt, with a trailing view as he runs, jumps, and glides; but switch to sniper mode and the view changes to a magnified rifle scope. Shiny claims the game's sniper gun will be the most accurate weapon ever in a video game. So accurate, that you'll be able to zoom in and shoot the arm off a bad guy standing at the other end of the city. Collision detection will be so precise that you might miss your target because the bullet passes between your enemy's legs.

MDK's graphics will feature a high-color SVGA palette, and based on our look at a work in progress, the game looks fabulously dark and eerie. The environment doesn't just *look* good, it's all interactive. In the demo level we saw, Kurt shot the cables that tethered a huge floating blimp and used it to escape.



Don't shoot until you can see the lizard's smile.

Don't expect your target to hold still.

The game's AI looks groundbreaking, too. The aliens observe a chain of command and communicate with each other; often giving away your position. Take out an alien captain and his troops might turn tail and run, or they might fall to the ground begging for mercy.

If Shiny delivers on the promises, *MDK* could be the action-fest to rival *Quake*.

— *Chris Dunphy*

product info

AVAILABLE: feb 97
PRICE: TBA
COMPANY: Shiny Entertainment
PHONE: 714.428.2112
URL: www.shiny.com

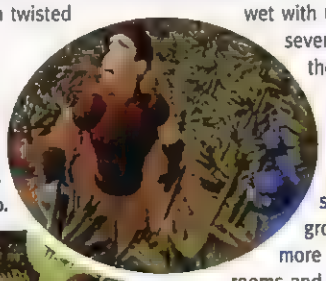
Ecstatica 2

Demons and monsters and gargoyles! Oh my!

Try it out! demo on the bootDisc

Popular games inevitably spawn sequels. *Ecstatica 2* will build on the winning formula of its parent title: a hack-and-slash fest staged in a world filled with twisted violence.

Ecstatica 2 will feature a new story, new monsters, and a complex environment. A demonic horde has slaughtered your family and all the inhabitants of your village. The walls of your castle are wet with their blood, and severed limbs litter the floor.



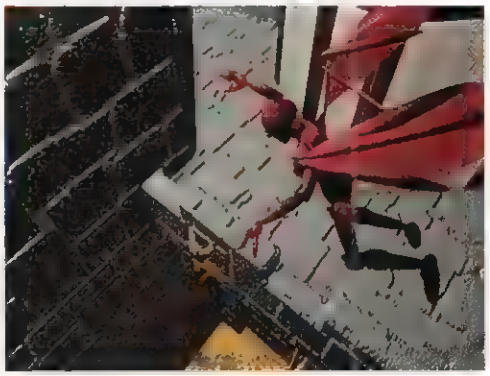
Monsters are watching your back. You'd better watch it too.

You'll end up fighting your supernatural foes in a variety of settings.

Gameplay will take place in a huge castle and the surrounding grounds, with more than 1,000 rooms and outbuildings to explore (including a dungeon). Psygnosis has designed an all-new ellipsoid animation engine that will produce realistic characters and backgrounds without requiring a polygon accelerator.

All of this action/adventure game's graphics are being rendered in SVGA, and there will be a host of distinctive camera angles to imbue it with a cinematic feel. But Psygnosis promises the game won't degenerate into an interactive movie. New character control features are being added, including the ability to perform sideways rolls, 180° swipes, roundhouse kicks, and a collection of evasive defense maneuvers.

You'll also need to manipulate objects and manage an inventory while you explore the environment. You'll encounter restorative potions, spells, weapons, rotting cadavers, and monsters. Lots of monsters.



The gargoyle stone statues have come to life, just in time to watch you plummet to your spine-breaking death.

Ecstatica 2 shouldn't disappoint fans of the original game, and its blend of fast action and good looks has the potential to win a whole new audience.

— *Bryan Del Rizzo*

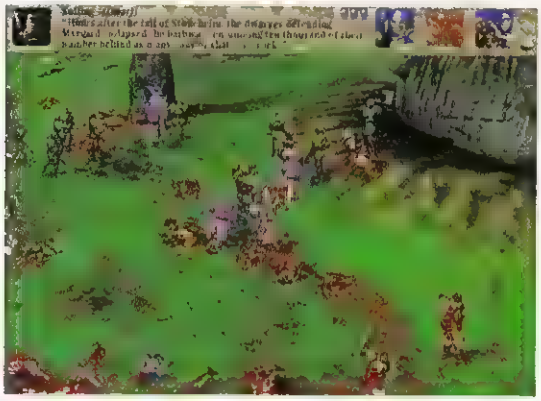
product info

AVAILABLE: early 97
PRICE: TBA
COMPANY: Psygnosis
PHONE: 800.438.7794
URL: www.psygnosis.com

S/W

Myth

Mel Gibson would be proud



Soldiers will be 3D-rendered objects, with individual behaviors. Each will have his own name and personality.

Myth promises to take real-time strategy gaming to a new level with real-time 3D animation and advanced AI. Instead of commanding armies of two-dimensional ants, your medieval soldiers will be recognizable 3D people with articulated limbs and individual behaviors.

"We're using real-time 3D animation," says Doug Zartman of Bungie, "because we want to achieve realistic battle. We want to create a game that is as realistic as the movie *Braveheart*, where thousands of warriors run toward one another and attack at full speed."

Toward that end, each player in a multiplayer game will control up to 1,500 characters. "At a tactical level," says Zartman, "you can control individual characters or groups of them by clicking and issuing orders." But based on the work-in-progress we saw in October, *Myth* looks as though it will be much more than just another *WarCraft* clone.

Weather conditions will affect *Myth*'s action.

Players will be able to write custom Java scripts to control every element of the game. "You could write a script that instructed a group of soldiers to scout out a building, or for the weather to change from clear skies to snowing, or for a volcano to erupt," says Zartman. "But the game will control just how much you can do. If you're in a multiplayer game, we don't want you to take unfair advantage over the other players."

Myth will feature 20 unique types of units (including archers, dwarves, swordsmen, and infantry), but each character will have a unique name, behavior, and health. The game's engine will track every character and every object.

"If a soldier is killed," says Zartman, "and he drops his ax blade on the ground, the ax blade will remain a live, dynamic object. If an explosion occurs near the ax blade, it will fly through the air. If it hits someone, it could injure or even kill him. It will be in the nature of some characters to pick up objects and weapons they see laying on the ground. One undead character goes around collecting heads, another picks up and throws weapons. And all of this will be rendered in real-time 3D."

Myth will run on a fast standard Pentium, but it will also take advantage of a 3D accelerator and a Pentium MMX. With its real-time 3D animation, 16-bit graphics, Java scripting, and massive scope, *Myth* looks capable of delivering on Bungie's promise to take this genre to a new level.

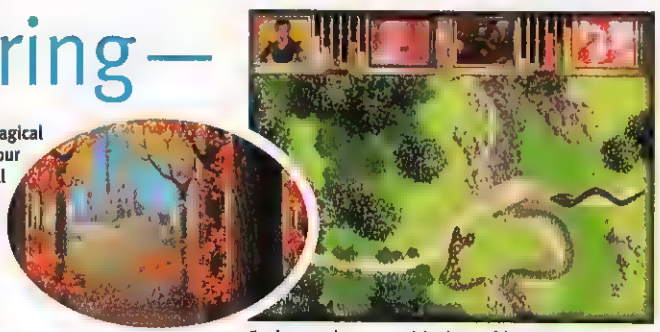
— *Michael Brown*

product info

AVAILABLE: first quarter 97
PRICE: TBA
COMPANY: Bungie Software
PHONE: 800.295.0060
URL: www.bungie.com

Magic: The Gathering—BattleMage

Mage-on-Mage mayhem



One of many magical realms your BattleMage will draw energy from.

Conjure and command legions of beasts across a multitude of battlefields in *BattleMage*.

Enter the darkly chaotic, ethereal world of Corondor, where ancient and powerful mystics vie for power across a war-torn realm. Mighty magical energies will wane and surge with the video game version of Wizards Of The Coast's highly infectious and insanely popular card game.

Rather than going for a straight interpretation of the game (a version of which Spectrum HoloByte is close to completing), Acclaim will tackle the convoluted intricacies of Magic: The Gathering with a real-time action/strategy game. Purists may scoff at such a bastardization, but Acclaim promises the spirit of the Fourth Edition's rules and rites will remain intact, with all the nuances of magical combat and chaos, including artwork from more than 200 popular Magic: the Gathering cards, hidden artifacts, monsters, and more.

BattleMage promises two modes of play that will entice both new and old Magic players: The traditional Duel Mode, where you build a customized army of creatures and spells (chosen from a pre-made, random, or custom library), and pit them against a CPU or human opponent; as well as a more detailed and in-depth turn-based Campaign Mode, where you'll attempt to conquer the 30 territories of Corondor, gather unearthly magical artifacts and spells, and eventually pit your spell-casting powers against other PlanesWalkers hell-bent for mana. All roads will lead to a final showdown with the insane, renegade PlanesWalker Ravidel.

Acclaim hopes that the magic is still alive, and that you'll fall under its seductive sway.

Just watch out for that Lord Of The Pit... he's a bitch.

— *Andrew Sanchez*

product info

AVAILABLE: dec 96
PRICE: TBA
COMPANY: Acclaim
PHONE: 516.759.7800
URL: www.acclaimnation.com

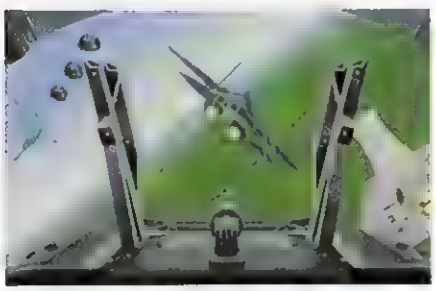
S/W

U.S. Navy Fighters '97

More of a good thing

If you've already cleared the bogeys out of *U.S. Navy Fighters*' skies, you must be one a helluva pilot. Well, get ready for more aerial action in *U.S. Navy Fighters '97*, the latest in Jane's Combat Simulations series.

Don't expect anything dramatically new or different here, just more of the same nail-biting, hold-onto-your-butt flying and fighting that made the original *USNF* about the hottest flight sim around. This version gives you a batch of new missions and spankin' new planes to save the world with.



Nowhere to run to, baby! Nowhere to hide.

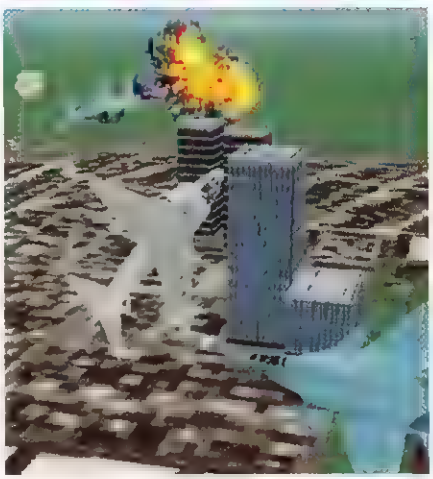
Original *USNF* players asked for a Vietnam scenario, and EA/Origin have delivered a campaign of 25 carrier-based missions based on historical U.S. operations.

USNF '97 also includes the Ukraine campaign from the original sim and the Kuril Islands scenario from the *Marine Fighters* expansion disc; while the new Vietnam campaign means new planes: the F4-B, F4-J, F8-J, MiG-17, and MiG-21F.

There are some welcome changes and additions to *USNF*: The Pro Mission Creator lets you design missions in any of the campaign theaters; if there's an AWACS plane or a radar ship in the area, you can receive information about enemy aircraft; and if you feel the cool target views aren't fair to the enemy, you can toggle a realistic targeting mode. When it's on, you won't get a window on the HUD unless the target's in visual range. And forget about those hot keys to locate targets.

Running native under Win95, *USNF '97* will support head-to-head modem play and up to eight players on a network.

— Lee Buchanan



Turn-and-burn against ferocious MiGs in *USNF '97*.

product info

AVAILABLE: nov 96
PRICE: $54.97
COMPANY: Jane's
PHONE: 800.245.4525
URL: www.ea.com/janes

Jedi Knight

The Force is strong in this one!

You came seeking answers, but Stormtroopers sought your head. With a flash of azure electricity, your light-saber cut through their armor like butter. Now the Force surges within you. You are Kyle Katarn—Jedi Knight—and you must stop those who seek to plunge the universe in eternal darkness.

The latest offering from the geniuses over at LucasArts is proof positive that *true* 3D immersion is invading the PC like a runaway freight train. Gone are the "2 1/2D" ray-cast 45°-angle walls of *Wolfenstein 3D*, *Doom*, and the countless knockoffs. Now, enter a real-time-rendered polygon world. *Quake* was the first, but LucasArts' *Jedi Knight* is poised to push the envelope even further. A totally re-engineered JEDI gaming engine has been optimized for a true 3D SVGA light-sourced, texture-mapped world. Each and every object (from Stormtroopers, to fellow Jedi Knights) has been given polygonal life, and gamers blessed with a red-hot 3D accelerator will be treated to blazing Direct3D-accelerated action. Throw in an ongoing, interactive storyline (you choose whether you'll follow the Light Side or the Dark Side of the Force), interconnected with movie-quality FMV cinematics and multiplayer mayhem (Jedi-on-Jedi violence—excellent!); plus LucasArts' commitment to detail and immersion, and you may just have the *Quake*-killer everyone's lusting for. (And don't worry, along with all the deadly new weapons and Jedi mind powers, you'll be wielding the infamous light saber.)

An Imperial Walker is the least of you worries in this polygon confrontation.

Kyle Katern returns, this time with the Force at his side.

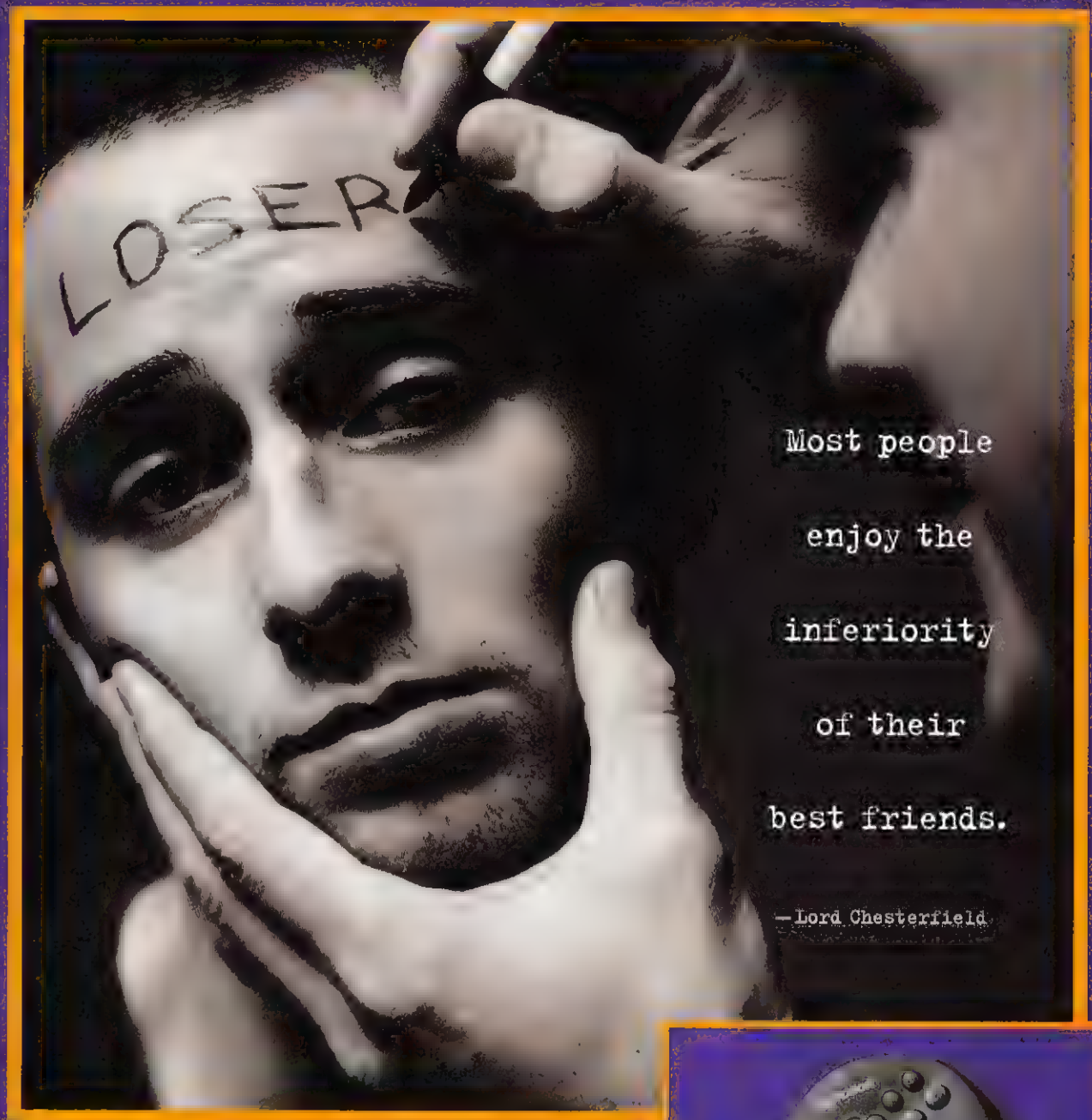
3D rendered cut-scenes and FMV add sizzle to the in-game spice of *Jedi Knight*.

If *Quake* started a revolution, *Jedi Knight*'s intricately interwoven storyline, cinematics, and polygon-pushing 3D environment may be the next evolutionary step toward total 3D immersion.

— Andrew Sanchez

product info

AVAILABLE: late first quarter 97
PRICE: TBA
COMPANY: LucasArts
PHONE: 800.985.8227
URL: www.lucasarts.com



Compete head-to-head. Surrender nothing.

The Microsoft SideWinder game pad makes it a fair fight for you and up to three of your best friends. Hook up to any of your Windows 95–based games and all four (or three, or two) of you get the same fully functional, lightning-fast game control and multibutton maneuvers. So no matter how many are plugged in, the competition's still quick and exciting. It's a perfect fit for hands of all sizes, letting you keep a solid grip and making it easier to use any of the buttons or triggers to vanquish your opponents. Record complicated, hard-to-remember multibutton moves and map them to a single button for swift execution of lethal maneuvers. Remember, the more SideWinder game pads you own, the more friends you can take advantage of. A little friendly competition never hurt anyone, right?

Microsoft

Where do you want to go today? www.microsoft.com/sidewinder/

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boot

reviews

KICKIN' THE TIRES ON THE LATEST **HARDWARE** AND TAKIN' THE NEWEST **SOFTWARE** OUT FOR A SPIN

H/W

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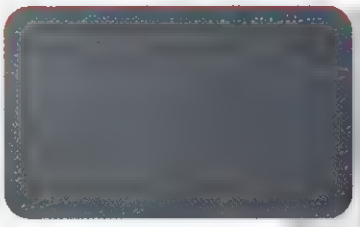
104 **SCSI**Vision
104 Gene**Wars**
104 **Presto!** PageManager Suite
107 Descent **Mission Builder**
108 **Verbal** Commander
108 Duke Nukem 3D **Plutonium Pak**
110 **You Don't** Know Jack 2
110 Return **Fire**
110 **Wing Commander:** The Kilrathi Saga

H/W

Toshiba Infinia 7200

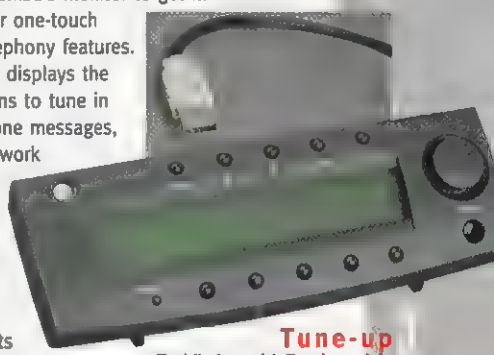
An awesome first effort



A signature is a powerful symbol. The signatures engraved into the case of the Toshiba Infinia represent a design team proud of its work. And they have a right to be. The Infinia features a bold new case that demands to be noticed. Under the hood, things are only slightly less exciting.

Toshiba's unique InTouch module is the coolest feature of all. The LCD panel mounts to the front of Toshiba's new multimedia monitor, but it can be used as a stand-alone device as well. The device is bundled with this model, so you don't have to buy Toshiba's monitor to get it.

The panel plugs into a USB port to deliver one-touch access to the computer's multimedia and telephony features. Use it with the bundled TV/radio tuner and it displays the station currently tuned in. Program the buttons to tune in your favorite stations, play back your telephone messages, play audio CDs, and more. The device won't work with the USB ports in other computers.



Tune-up
Toshiba's cool InTouch module controls multimedia and telephony functions. The LCD panel communicates with the operating system through the host computer's USB port.

The model 7200 is the most powerful of the line. Because Toshiba is using an S3 ViRGE 2D/3D-graphics accelerator on the motherboard, the 7200's 2D graphics performance is low on our performance scale, in which Matrox's screamin' MGA Millennium sets the 2D pace. Toshiba's video drivers are not VESA 2.0-compliant, so we had to install SciTech's *Display Doctor* utility to get *Quake* to run in 640x480.

Audio capabilities are even less exciting, offering only FM synthesis via Yamaha's ancient OPL-3 chip. But with a suggested list price of $2,799, you could buy more powerful graphics and audio solutions and still end up spending less money than you would for some other computers.

The elegant black and brushed chrome case vaguely resembles HP's Pavilion line, but Toshiba's machine is much more refined. Toshiba simply hides the reset button behind a door on the front of the case. Swing the door open (be gentle, it might fall off) and you'll find removable access panels for two 5.25-inch drive bays.

DOUBLE TAKE

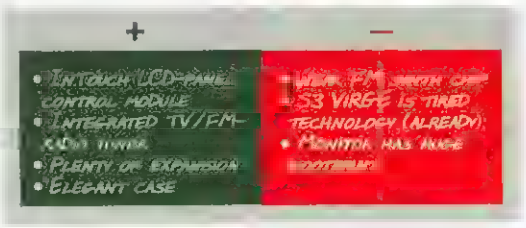
THE INFINIA ATTEMPTS TO BE AN EVERYTHING-TO-EVERYONE ALL-IN-ONE SOLUTION. DESPITE THE GOOD INTENTIONS, THE INFINIA IS REALLY JUST THE FIRST STEP TOWARD THE PC AS A HOUSEHOLD APPLIANCE.

– B.D.

Remove the Infinia's side panel (a beautiful design with no screws) and you discover a spacious interior. The Intel Tucson motherboard features only three PCI and three ISA slots, but these are mounted directly on the motherboard; there is no riser card to deal with. A TV/FM-radio tuner occupies one PCI slot and a 33.6Kbps modem occupies one ISA slot. The four SIMM slots (two occupied) are easily accessed.

The Infinia 7200 isn't a screamer, but it's apparent that Toshiba spent considerable time, money, and effort to design a computer that's more than a me-too box. If you like good design, you'll love the Infinia.

— Michael Brown



under the hood

the brains

CPU.....200MHz Intel Pentium
External Cache ...256K pipeline burst
RAM.....32MB EDO DRAM (128MB max)
Video.....S3 ViRGE 2D/3D-graphics accelerator on motherboard with 2MB EDO DRAM

the brawn

Hard Drive.....3GB Western Digital Caviar 33100
CD-ROM.....8x Toshiba IDE-ATAPI
Expansion Bus ...3 ISA, 3 PCI; one of each occupied
Fax/Modem.....28.8Kbps with full-duplex speakerphone

the beauty

Monitor .....17-inch Toshiba Infinia, Invar shadow mask, 0.28mm dot pitch
Sound Card.....Yamaha OPL-3 FM synth on motherboard
Speakers .....stereo pair plus subwoofer integrated into monitor
Other .....InTouch LCD control panel, infrared remote, two USB ports

the bundle

Get Ready For School, Charly Brown • TerraTopia • Mayo Clinic Family Health • Shanghai Great Moments • Family Album Creator • Quicken SE • Microsoft Works & Microsoft Money • Microsoft Golf • Microsoft Encarta '96

the goods

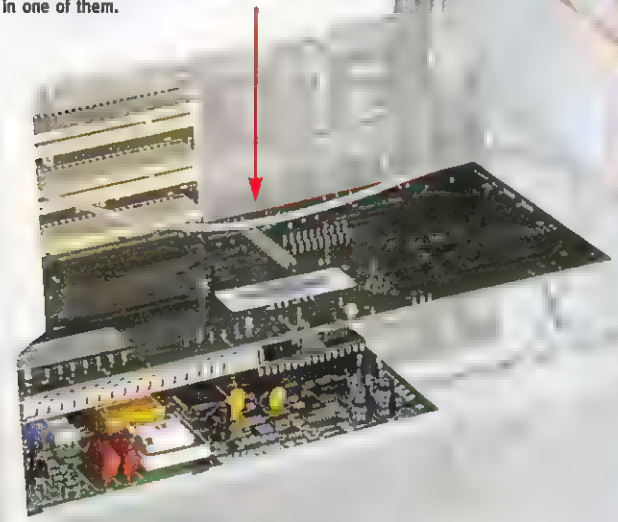
Toshiba's Infinia 7200 features a bold design and a number of innovative features, not the least of which is its InTouch LCD control panel.

Remote Control

The infrared remote controls the cursor, volume, telephone, answering machine, and CD player. It can also tune the TV/radio receiver.

Green Acres

The Intel Tucson motherboard has its expansion slots mounted directly on the planar—no riser board here. With a 28.8Kbps modem in one ISA slot and a TV/FM-radio tuner in one PCI slot, there's only two of each available for expansion. There's plenty of room for additional drives, but you'd probably want to remove the swinging door if you were going to put a CD-ROM changer in one of them.



In Your Face

Toshiba's optional 17-inch multimedia monitor is as striking as the computer it's designed for. With its speakers mounted in columns on either side and its built-in ported subwoofer hanging off the bottom, it's a dead ringer for one of MTV's animated logos.

The 4.5x2-inch, 5-watt stereo speakers are mounted on huge rubber shock absorbers to isolate them from the picture tube. They pump out plenty of sound for near-field listening, but they don't offer much in the way of frequency response. Sound is concentrated in the midrange; lows are elusive, even with the subwoofer. The monitor's massive footprint spreads across 21.5 inches of your desk—that's 1.5 inches bigger than most 21-inch monitors.

Stand Up

The monitor doesn't swivel, but it tilts on this spring-loaded foot. Simply push the back of the monitor to tilt it up, or pull to tilt it down. The heavy plastic material didn't mar our Formica desktop, but you'd want to be careful sliding it across fine wood.

boot verdict

PRICE: $2,799
(17-inch monitor is $749)
COMPANY: Toshiba America Information Systems
PHONE: 800.334 3445
URL: www.computer.toshiba.com

A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

S/W

boot labs Review Policies

boot *isn't like any other computer magazine, and neither is our product* ***evaluation*** *process. We don't test equipment in the cold, sterile environment of a warehouse-sized lab, and we don't write our reviews based on the* ***test scores*** *that lab-coat-wearing technicians scribble on clipboards.*

Our review ***scores*** *are based on a combination of objective* ***benchmark*** *testing, real-world performance, and our* ***subjective*** *evaluation of features, performance, and the many less tangible* ***characteristics*** *that go into a product. All of our evaluations are based on* ***hands-on*** *use of the product.*

Only the best earn enough respect to be worthy of our editors' choice award.

The boot-o-meter explained

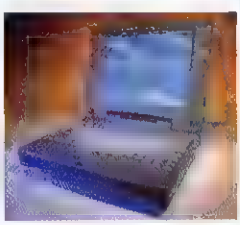
For our tests, we use Ziff-Davis' WinBench 96 suite of benchmarks to measure CD-ROM and hard-disk drive performance (kilobytes per second), as well as graphics speed under Windows (millions of pixels per second). All systems are tested at 1024x768 resolution with 16-bit color depth. All notebooks are tested at 800x600 resolution with 16-bit color depth (they're also tested at higher resolutions, if higher resolutions are supported). We judge DOS video performance by measuring the number of frames per second that a system is capable of pumping out while playing games such as *Descent II* (at 640x400 resolution) and *Quake* (at 640x480 resolution on desktop systems; 320x480 res on notebooks).

In our real-world tests, we measure how long it takes a system to perform specific tasks: Rendering a video transition in Adobe's *Premiere*, applying a gaussian-blur in *Photoshop*, and rendering a wireframe scene in NewTek's *LightWave 3D*. The performance is guaged on a scale of 1 to 9 in each of these areas, average the scores, and arrive at an overall performance rating. The details of each test (specific frame counts and such) are always available on the *bootNet* Web site at **www.bootnet.com**.

Our performance scales are based on systems that we consider to be among the best in their class, and we change those reference standards every six months. If the system reviewed equals or exceeds the performance of the reference platform (a score of five or better), the boot-o-meter dial is green; if it scores a four, the dial is yellow; and if it scores a three or less, the dial is red.

Our Reference Desktop PC

Gateway's P5-166XL is our reference desktop computer because it's a workhorse, delivering solid benchmark scores all around. Systems shipped since the P5-166XL—especially 200MHz Pentium systems—should at least match its performance.



Our Reference Notebook PC

We selected Fujitsu's Monte Carlo as our reference notebook because of its excellent benchmark scores. The Monte Carlo's use of more expensive VRAM, instead of the slower DRAM, resulted in exceptional graphics performance.

The bootVerdict

The fastest computer in the world is useless if it's poorly designed. That's why we evaluate a host of subjective criteria in addition to rigid benchmarks. We look at a machine's overall design, its ergonomics, expandability, ruggedness, and advanced features.

We also carefully consider a manufacturer's component choices, including the quality of the sound card, speakers, modem, keyboard, and mouse. We count expansion slots and drive bays. We take off the case and put it back on. We plug in drives and cards to judge how easy—or difficult—it is to expand the machine. These might seem like minor considerations, but they have an enormous impact on the level of satisfaction a new computer delivers. Our final rating is an amalgam of the objective benchmark ratings and these subjective judgements.

DOUBLE TAKES
GIVE A SECOND EDITOR'S HANDS-ON OPINION OF THE SYSTEM BEING REVIEWED.

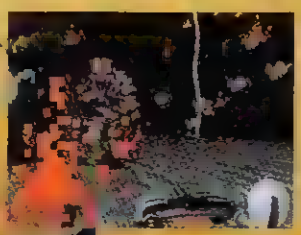
PROBABLY THE ONLY GUY TO OPPOSE THE DEATH PENALTY ON GROUNDS THAT IT'S MORE FUN TO DO IT YOURSELF

ATOMIC EDITION

DUKE NUKEM 3D

ATOMIC EDITION

The original Duke Nukem 3D plus an incredible new never-before-seen episode. Now available in stores.



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www.3dreal

3D Interactive Software

NEW YORK, NY 10018

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Product Information Number 151

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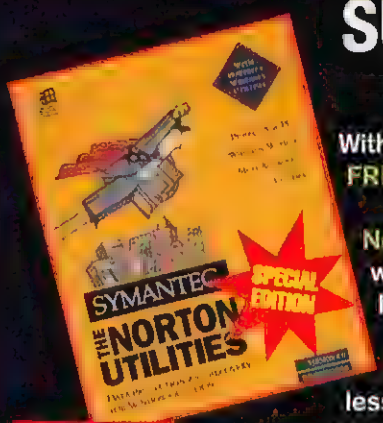

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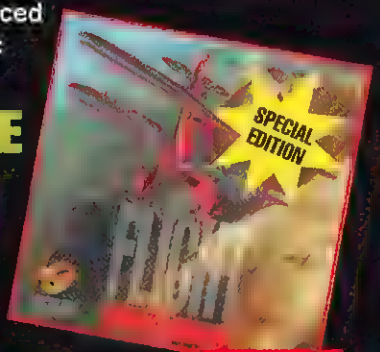

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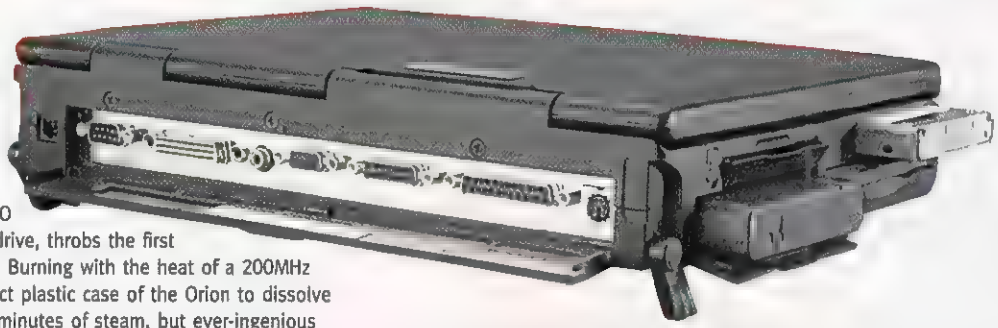
Nimantics Orion 8X-200

Go Speed Racer, go!



Nimantics specializes in laptop computers with a twist. They were the first to make a notebook around a *desktop* 166MHz Pentium, and now they've introduced the Orion 8X-200 notebook PC.

Beneath the Orion 8X-200's 32MB of EDO DRAM, 8x CD-ROM drive, and 1.35GB hard drive, throbs the first 200MHz Pentium ever found in a notebook. Burning with the heat of a 200MHz desktop processor, you'd expect the compact plastic case of the Orion to dissolve into a puddle of molten plastic after a few minutes of steam, but ever-ingenious Nimantics has incorporated a patented heat sink and cooling system to keep the components nicely chilled. The fan makes a racket, but think of it as the rumble of a muscle car.

Both a CD-ROM drive and a floppy drive cohabitate within the Orion, so you won't have to worry about swapping. You can, however, swap out the floppy for a second battery, boosting road life to nearly two hours. Both the CD-ROM drive and the hard drive posted excellent results during our speed tests. The hard drive is also modular, so you can pop it in your pocket for added security while traveling.

Warning: You'll pay for all this muscle with your own sweat and blood. The Orion packs a carrying weight of almost 11 pounds. But then again, those classic Camaros carried some serious curb weight too.

Nimantics' 166MHz model had a gamepad built directly into the case. This time out with the Orion 8x-200, they've wisely replaced it with a standard 15-pin game port connector, located on the rear panel. Simply plug any joystick or controller directly into the port without any adapters.

The bright 12.1-inch active-matrix display folds almost flat for those times when you're attached to a desktop monitor. The Trident Cyber 9385 video chipset driving that screen delivers uninspired performance under Windows—surprising for a machine equipped with 2MB of VRAM—but performed substantially better in DOS. Running *Descent II* at 640x480, the Trident pumped out an impressive 20.3fps.

Another innovative feature the Orion sports is built-in hardware MPEG decoding that flows buttery-smooth full-screen video playback rivaling the performance of desktop graphics accelerators. Hook up a big-screen monitor to the Orion's RCA-out jack and enjoy.

The Orion is also equipped with an ESS Technology ES1788 FM audio chip and SIS's 1MB of wavetable samples in ROM. You'll need to tweak the Control Panel settings in Win95 to activate the wavetable audio; otherwise, it defaults to FM synthesis. The wavetable samples aren't the best, but they're leagues better than FM.

Minor quibbles aside, you have to give Nimantic's credit for pushing the envelope. Overall, this machine is a powerhouse with few compromises. As Nimantics replaces the weaker components, such as the video chipset, with more robust solutions, they'll continue their march toward the ultimate notebook PC.

— Bryan Del Rizzo

They're Magically Delicious

Opening the back panel on the Orion 8X-200 is like sticking your hand in a box of Lucky Charms. You'll find the usual marshmallows, such as serial, parallel, and VGA ports, but dig deep and you'll find some four-leaf clovers: a dedicated game port and an RCA video-out jack for the hardware-based MPEG decoder. Connect the optional docking station, and you can sell your desktop machine. The Orion 8X-200 also sports three PCMCIA slots that can accommodate three Type II devices, or one Type III and two Type II devices.

DOUBLE TAKE

I'M AS MUCH OF A POWER FANATIC AS THE NEXT GUY, BUT THE WHINING FAN ON THIS POWERBOX IS ENOUGH TO GIVE YOU A HEADACHE. ALTHOUGH, YOU GOTTA GIVE NIMANTICS A BUTTLOAD OF CREDIT FOR PACKING SO MUCH POWER INTO A LITTLE BOX.

– M.B.

Brick House

This hefty power supply adds to the Orion 8x-200's portly dimensions.

A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

under the hood

the brains

CPU.....200MHz Intel Pentium
External Cache.....256K pipeline burst
RAM.....32MB EDO DRAM (72MB max)
Video.....Trident Cyber 9385 chipset with 2MB EDO VRAM; onboard hardware MPEG decoder; Zoomed Video Port

the brawn

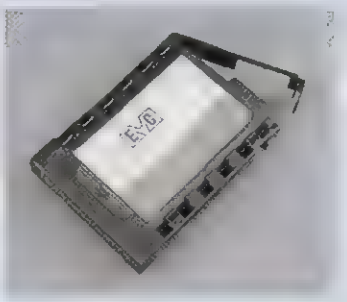
Hard Drive.....1.35GB Toshiba MK1002MAV EIDE
CD-ROM drive.....TEAC 48e 8x IDE-ATAPI
Expansion.....Type II PCMCIA cards or 1 Type III and 1 Type II
Lap Weight.....8 pounds, 2 ounces (with one battery)
Carrying Weight....10 pounds, 9 ounces

the beauty

Display.....12.1-inch active matrix
Sound.....ESS Technology ES1788 FM synth with 1MB wavetable sounds in ROM
Video.....800x600, 16-bit color
Speakers.....Stereo, plus headphone jack
Communications...IrDA-compliant infrared, 33.6Kbps PCMCIA fax/modem

the goods

This is the Nimantics Orion 8X-200. The 200 refers to the speed of the Pentium processor inside. Need we say more?

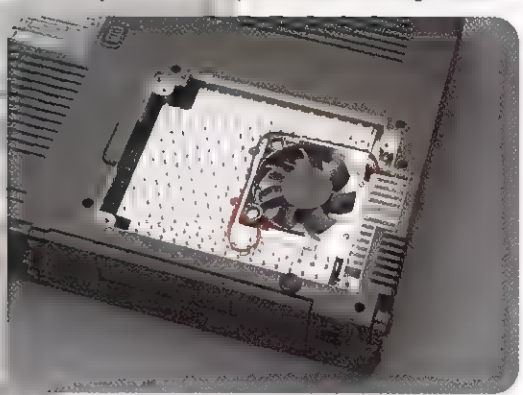


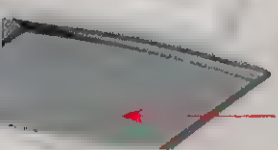
Strap On

With this adapter rig, you can swap the Orion's floppy-disk for a second nickel-metal hydride battery. The batteries are compatible with Duracell's DR-36 form factor, so lithium-ion upgrades will be possible in the future. But even with the second NiMH battery (weighing in at a whopping 1.6 pounds), I'd recommend staying close to a wall outlet at all times. At most, you'll only get one hour out of a battery.

Bottoms Up

Open the bottom of the Orion 8X-200 and you'll find a metal alloy heat sink epoxy-bonded to the Pentium. The huge fan is far from quiet, but keeps components cool. According to Nimantics, the heat from the processor might melt the plastic in the vents, so you'll want to keep the machine's rear legs elevated.





Feeling It Up

The 86-key keyboard offers great tactile feedback, but I prefer a bigger spacebar, CTL, and ALT keys. The touchpad is far too sensitive, but the two buttons below are solid, and have a ridge for resting your fingertips. The battery doesn't comply with Win95's power-management system, so you'll have to rely on the LCD panel that graphically shows the battery power setting, battery life, hard-drive access, and AC power status.

+	−
•200MHz Pentium •Simultaneous floppy drive and CD-ROM drive •Standard 15-pin game port •Zoomed Video Port •Hardware MPEG decoder	•Short battery life •Touchpad too sensitive •Noisy fan •Heavy

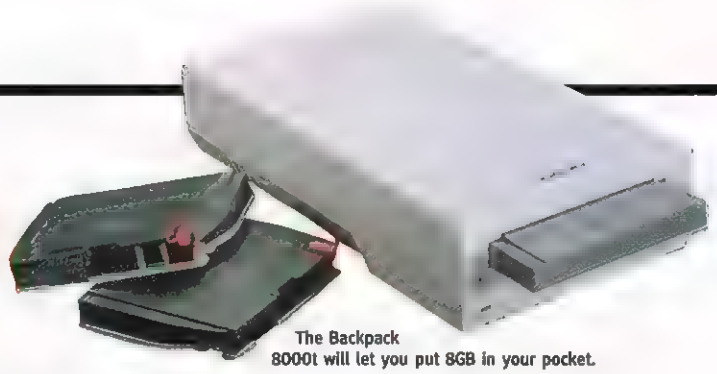
boot verdict

PRICE: $4,999
COMPANY: Nimantics
PHONE: 800.646.5005
URL: www.nimantics.com

H/W

Backpack 8000t

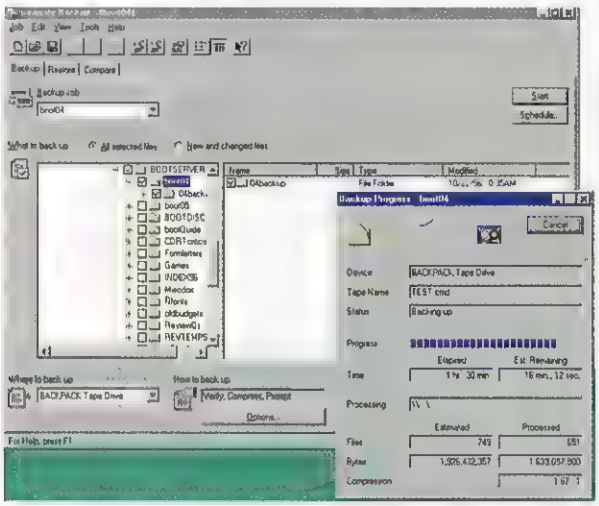
Gigs to go



The Backpack 8000t will let you put 8GB in your pocket.

Imagine your hard drive has crashed. Sobering, isn't it? Fact is, no drive will last forever; and with today's multi-gig drives, a crash could be devastating. Think of the Backpack 8000t as an insurance policy.

This external tape drive plugs into your parallel port and provides a pass-through for your printer. The drive supports enhanced and IEEE 1284 parallel ports, so it can write up to 30MB per minute. OK, so that's not as fast as a SCSI drive, but because it doesn't require an interface card, you can easily use it with more than one computer (including your notebook). And the 8000t's portability makes it an ideal way to transfer large chunks of data between PCs.



Seagate Backup **comes bundled with the 8000t to restore your goodies.**

The 8000t uses $40 Travan TR-4 tape cartridges, which hold 4GB of uncompressed data and almost 8GB compressed, but it's also backward-compatible with several other formats (see table at right).

Micro Solutions' user manual is little more than a sheet of paper, but setting up the drive is a no-brainer. Just remember to install the driver (provided on a floppy disk) before running the provided *Seagate Backup* utility. The software (in Windows 95, 3.1, and DOS versions) makes backups and restores a breeze. You can even schedule unattended incremental backups to run automatically.

In our trials, the 8000t backed up the 1.8GB *boot* 04 archive in less than 2 hours, crunching the hefty volume down to 1.1GB on tape. Backing up the 180MB of data files on a local drive took less than 7 minutes.

Remember, today could be your hard drive's last. The Backpack 8000t is a great way to ensure that you'll survive its passing.

— Chris Dunphy

Read/Write Media	Size (Raw/Compressed)
Travan TR-4	4GB/8GB
QW-3080XLF	2GB/4GB
QIC-3080	1.6GB/3.2GB

Read Only Media

TR-1; TR-2; TR-3; QIC-Wide; EC; QIC-3010; QIC-3020; QIC-80; DC2120

boot verdict

PRICE: Drive $549; Media $40
COMPANY: Micro Solutions
PHONE: 800.890.7227
URL: www.micro-solutions.com

S/W

Oil Change

Zen and the Art of PC Maintenance

Try it out! demo on the bootDisc

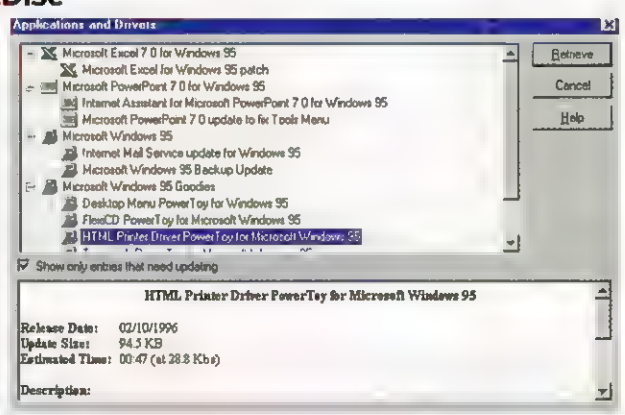
Unless you spend hours each week searching all ends of the web for new updates, bug fixes, and goodies, I guarantee that some of the software on your PC is out of date. But *Oil Change* promises to do all the grunt work that you need to stay current. With a few mouse clicks and an Internet connection, *Oil Change* scans your system for more than 1,000 recognized titles, and then checks a central database maintained by CyberMedia for updates, drivers, plug-ins, or patches.

Oil Change's capsule summaries help you decide if the fix is actually worth your time. If it is, a mere click downloads it from the web. Often, *Oil Change* can even install the update for you, or guide you through a manual installation.

Running *Oil Change* regularly keeps your software and drivers current and it even updates the list of apps that *Oil Change* supports.

On the downside, the Undo function should be able to uninstall more than just the last upgrade performed. But all nit-picking aside, *Oil Change* this is a good implementation of a great idea.

— Chris Dunphy


Applications and Drivers
Microsoft Excel 7.0 for Windows 95
Microsoft Excel for Windows 95 patch
Microsoft PowerPoint 7.0 for Windows 95
Internet Assistant for Microsoft PowerPoint 7.0 for Windows 95
Microsoft PowerPoint 7.0 update to fix Tools Menu
Microsoft Windows 95
Internet Mail Service update for Windows 95
Microsoft Windows 95 Backup Update
Microsoft Windows 95 Goodies
Desktop Menu PowerToy for Windows 95
FlexCD PowerToy for Microsoft Windows 95
HTML Printer Driver PowerToy for Microsoft Windows 95
Retrieve
Cancel
Help
Show only entries that need updating
HTML Printer Driver PowerToy for Microsoft Windows 95
Release Date: 02/10/1996
Update Size: 94.5 KB
Estimated Time: 00:47 (at 28.8 Kbs)
Description:

Oil Change **keeps your software from getting stale.**

boot verdict

PRICE: $39.95 (for one year of service)
COMPANY: CyberMedia
PHONE: 800.721.7824
URL: www.cybermedia.com

S/W

boot KICK-ASS! PRODUCT

F-22 Lightning II

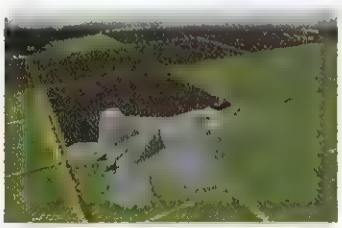
An electrifying achievement

The F-22 is primarily an air-superiority fighter, but you get a chance to knock out some ground targets, too.

There are more realistic flight sims out there. Hell, some "games" practically require a certificate from the Navy's Top Gun school. But none of these come close to matching NovaLogic's *F-22 Lightning II* for sheer beauty or the total thrill of flying. Fueled by a screaming frame rate (no fewer than 12fps at 640x480 on a P90 or better) that puts all the other high-end flight sims to shame, *F-22* is a rare achievement: a sophisticated simulation of modern air combat that also knows how to have fun.

As a hot-shot pilot of the world's most advanced tactical fighter, you get to fly four campaigns, totaling 36 missions; plus there's a mission creator—just fill in all the parameters and you're off. One look at the detailed HUD and accurate cockpit tells you that you're in for a ride.

While *F-22* contains all the realistic details needed to believe you're actually behind the 'stick of a real avionic wonder, the game doesn't weigh you down with tons of specs and weapons options. You have AIM-120 AMRAAM radar-guided missiles, AIM-9X Sidewinder heat-seeking missiles, and GBU-30 JDAM glide bombs for ground targets. Of course, for sheer fun, nothing compares to the detail work applied by your M61A2 20mm Vulcan cannon. Think of it as a machine gun on some serious steroids, tossing down some 6,000 rounds—each shell roughly an inch in diameter—every minute you squeeze the trigger. Clearly, the emphasis is on pure flying and furious fighting, and *F-22* delivers its payload right on target.



Rice paddies never looked so good.

F-22 Lightning II also flies high as a multiplayer sim, pitting gamers against each other in a deathmatch, or flying together in cooperative missions. The game accommodates up to eight players on an IPX network or two players via modem or serial cable. But before you pony up the cash for seven more copies, wait! *F-22*'s multiplayer options only require that one player have the actual CD-ROM in their machine. You've just gotta love that.

The SVGA graphics are easily the most sumptuous you'll find in any flight sim. NovaLogic's new polygon engine supports high density texture-mapped polygons with hazing and light sourcing. Lift your nose into the sim's translucent cloud cover and use their cover to stalk your prey before attacking from above. While NovaLogic promised MMX support when the product debuted at the E3 show in May of 1996, the shipping version does not support the instruction set. The four distinct terrain types featured in the campaigns—the jungles of Southeast Asia, the icy mountains of Siberia, the deserts of Iraq, and the Black Sea islands near Odessa—are all rendered with remarkable texture and realism, and cover thousands of miles. Even if there was nothing to shoot at, I'd recommend *F-22* on the strength of its cutting-edge graphics and sound effects alone. Heck, it's just a blast to fly the thing.

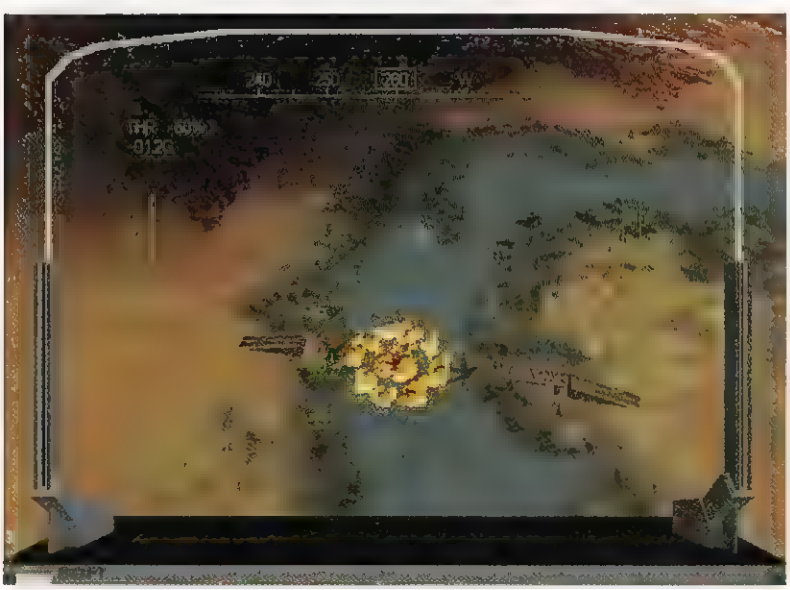
Don't expect much more from your wingman than some cool comments.

NovaLogic didn't skimp on the audio, either. *F-22* features a 16-bit Dolby Surround soundtrack. If your PC's speakers (such as Altec Lansing's ACS500), sound card, or stereo system are equipped with a Dolby Pro-Logic decoder, you're in for a real treat as friendly and enemy aircraft scream before your eyes *and* ears.

But you'll find you're not alone up there. There are plenty of bogeys (including Russian MiG-27s and SU-27s) and ground targets (such as tanks, airfields, and buildings) to challenge most desktop pilots. Still, *F-22* will disappoint some flyers. The game might prove too easy for hardcore flight fanatics. I played through the entire first campaign without losing my life or my plane, and I'm no Chuck Yeager. And since you can't adjust enemy strength or AI, there's no way to increase the difficulty level.

NovaLogic doesn't apologize for smoothing over some of the rough edges of realism. Their designers wanted a cutting-edge air-combat sim that's fun to play—and they've succeeded. Purists might complain, but I say let 'em whine! This sim pushes the envelope as hard as the F-22 itself.

— Lee Buchanan



Scratch one bridge. That should slow down Saddam Hussein's tanks.

boot verdict

PRICE: $44 95
COMPANY: NovaLogic
PHONE: 800.858.1322
URL: www.novalogic.com

H/W

Compaq Presario 3020

A horse of a different color

If Bang and Olufson built a personal computer, it would probably look something like the Compaq Presario 3020. But you can bet it wouldn't be beige.

Aside from its bland palette, the Presario 3020 is a remarkable computer. Compaq has packed all the functionality of a desktop machine—including expansion slots, CD-ROM changer, and JBL Pro Audio speakers—into a case with an integrated display and a footprint smaller than a 15-inch monitor.

Powered by a 166MHz Pentium, 256K cache, 24MB of EDO DRAM, and a 2.0GB hard drive, the 3020 sounds tough. But Compaq made some major performance tradeoffs. The 3020 is a 98-pound weakling compared to our desktop benchmark system, the Gateway P5-166. The biggest compromise is the machine's active-matrix, flat-panel display. After all, 12.1 inches is pretty small after you've grown accustomed to peering into the limpid pool of a 17-inch CRT.

Despite being small, the 3020's display (manufactured by Sharp) is drop-dead gorgeous. Since Compaq's engineers didn't have to worry about battery life, they specified two light sources and a very wide aperture for this LCD panel. And because the panel is perfectly flat, there's no distortion or glare to deal with. The panel doesn't swivel, but it does tilt.

Spend a few minutes up close with the 3020, even viewing its screen severely off axis, and your old-fashioned monitor will look dull as dishwater—notebook displays will look even worse. We can't wait until large-format LCD panel displays become more affordable, since Compaq estimates that the 3020's small screen accounts for $1,000 of the machine's final cost. Ouch.

Inside the 3020's case, you'll find the same motherboard and Triton VX core logic as Compaq's Presario 8710 minitower. Unlike the 8710, however, this model has only two open expansion slots on its riser board (one PCI and one ISA; both full length). There's a 2.0GB hard drive and an NEC 6x four-disc changer inside, but no open drive bays. Removing the case is a pain, but once it's off, all the important components are easily accessible.

Compaq designed the 3020 to be transported from room to room. They even built a handle into the back of the machine and designed the keyboard to hang on the front of the display. But before you have visions of toting the 3020 into the den for gaming, then into the kitchen for looking up recipes, then into the dining room to reconcile your checkbook; realize that this beast weighs upwards of 30 pounds. A notebook it ain't.

If you're looking for a computer that won't take over your desktop, or just to impress the neighbors, the Presario 3020 is the perfect choice. If you're looking for the state of the art in computer performance, look at more conventional systems. The 3020 is cool, but it's not powerful.

— Michael Brown

Side by Side

The left side of the machine holds the floppy-disk drive and all the I/O ports, including a VGA port to drive an external monitor. The graphics card can put out resolutions of 1024x768, but the onboard display handles only 800x600. It deals with the higher resolution by creating a virtual desktop. You can use the arm that connects the display to the chassis to tilt the display's viewing angle. The 6x four-disc changer is mounted on the right side. Inserting media into or removing media from either drive takes some getting used to because you can't see them unless you drag the computer around. But once you've developed a feel for it, it ceases to be an issue.

Ready to Populate

The 3020 comes standard with 24MB of EDO DRAM, but there are two open SIMM slots in case you decide that's not enough. The SIMM slots in this machine are more accessible than the slots in many minitower systems.

DOUBLE TAKE

THE ONLY THING MISSING FROM THE 3020, BESIDES A BIGGER LCD PANEL, IS A RADIO-FREQUENCY CORDLESS KEYBOARD AND MOUSE. THE CURRENT TETHERS FOUL UP THIS BEAUTY'S FASHION STATEMENT.

– B.D.

A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

under the hood

the brains

CPU.....166MHz Intel Pentium
External Cache.....256K pipeline burst
RAM.....24MB EDO DRAM (128MB max)
Video.....S3 Aurora 64V+, 2MB EDO DRAM

the brawn

Hard Drive.....2GB EIDE
CD-ROM drive.....NEC 6x 4-disc changer
Expansion.....2 full-length PCI, 1 full-length ISA, 1 proprietary modem slot; 1 PCI and 1 ISA slot open
Fax/Modem.....33.6Kbps DSVD modem with full-duplex speakerphone

the beauty

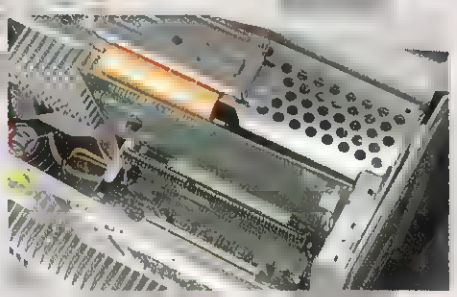
Monitor.....12.1-inch DoubleBright LCD
Sound.....ESS Technology ES1888
Speakers.....Stereo JBL Pro Audio speakers integrated into chassis
Other.....Two USB ports

the bundle

Compaq Phone Center • Microsoft Works • CorelDRAW 5 • Compton's Interactive Encyclopedia 1996 • Quicken Special Edition • PGA Tour '96 • Magic Carpet • Yukon Trail

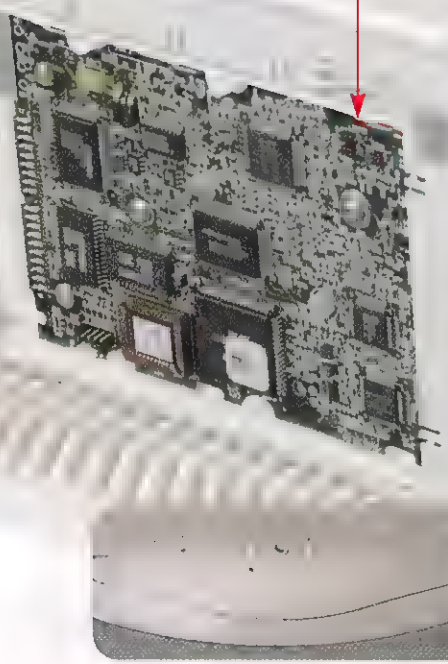
the goods

Compaq's Presario 3020 is an odd hybrid of notebook and desktop computers. If you can accept the relatively tiny display and some slow components, this is the perfect machine for people with limited desktop real estate.



Slim Jim
Even though the Presario 3020's footprint is just eight inches deep, Compaq made sure there was room inside for one full-length PCI slot and one full-length ISA slot. The 2.0GB hard drive is mounted on its side just below the riser board.

Hang Up
When you're ready to move the 3020 to another room, you can hang the keyboard on the front of the machine.



+	–
• Tiny footprint for a desktop machine	• Only a 12.1-inch display
• Luscious flat-panel display	• Only one PCI and one ISA slot available
• Semportable	• No open drive bays
• Good speakers	• Slow for a 166MHz Pentium

Button Brigade
Buttons at the base of the computer control the 3020's telephone and answering machine tools; adjust the volume and display properties; and select CDs in the CD changer. The half-moon button puts the machine into a power-saving Sleep mode or wakes it up.

boot verdict

PRICE: $3,499
COMPANY: Compaq
PHONE: 800.345.1518
URL: www.compaq.com

S/W

Amok

Try it out! demo on the bootDisc

A chance to whack sharks

Most shoot-'em-ups let you choose between great graphics *or* fast action. *Amok* combines both and delivers solid gameplay.

The story is inconsequential (turn the last two corporations against each other in order to create a Cold War peace). Maneuvering a Battle-Walker robot through nine missions and a variety of locales (including the Wastelands, Ocean, City, and Tunnels), you employ a wide assortment of weapons (including missiles, bombs, and miniguns), which provide lethal and noisy firepower. Power ups are scattered throughout to replenish energy and restock ammo.

Successfully reaching the end of each mission is your top priority, since running out of juice midlevel ends the game, unless you've logged the password. So paying attention to your compass and the Radar Map is a must—and it's really handy that Teleporters are scattered around for quick jumps.

Remember to keep your trigger finger oiled, because it's important to blow up just about everything you survey—it's the only way to learn of secret areas and discover the hidden mission.

The action proceeds at a good clip, and you can turn it up even higher by switching to fewer colors and lowering the resolution. Forget about running *Amok* off your hard drive, because you *must* play it all off the disc. Still, with a lower resolution and 256 colors, running from the disc doesn't hurt the explosions and it really pumps the funky music, which auto configs and plays through any Sound Blaster compatible card. Plus, the animations don't jerk or slow down.

Despite great visuals, such as the awesome underwater scenes, complete with sunken mountains (an excellent chance to whack any sharks that get in your way), there's no time for sightseeing. Mobile Droids and various missile banks are looking to blast your head off, so blast them first. And remember, speed kills, so destroy anything that gets in your way.

— Marshal M. Rosenthal

Smooth graphics and fast response are a must in any shoot-'em-up, and, in that regard, *Amok* is A-OK.

boot verdict

8

PRICE: $49.99
COMPANY: GT Interactive
PHONE: 800.305.3390
URL: www.gtinteractive.com

H/W

Konexx's special-purpose communications devices will get you online under any circumstances. All you need is a phone.

Konexx Line

Get connected anywhere

So, I'm at the office, and I need to check 28.8 transfer speeds for the bootNet site; except, like most larger companies, all the lines out are through a digital phone network. Normally this would be a problem, but not today. Today I have an Office Konnector hooked to my PC.

If you ever need to use an analog modem on a digital phone network, or if you discover that the only accessible phone is a pay phone, a cell phone, or that one hardwired to your hotel room wall; one of these black boxes will get you online with minimal hassle.

The Mobile Konnector and Office Konnector both allow an analog modem to access a digital phone network. The difference is: the Mobile Konnector runs on AC or battery, while the Office model only runs on AC. Simply plug the Konnector into the phone's handset jack, then plug the handset and the modem into the Konnector. Problem solved.

The Koupler, on the other hand, is simply a battery-operated acoustic coupler that you strap onto a telephone handset, (shades of Matthew Broderick and *War Games*, huh?). Plug in your modem and transmit data over any telephone line—even cellular and pay phones. All three products are rated for 28.8Kbps, but if you're using the Koupler with an older pay phone with a carbon microphone, Konexx recommends setting the modem to 2400bps to avoid data loss.

A peculiarity I encountered with our PBX system gave me the opportunity to test Konexx's tech support line, where I found the most patient and helpful people I've ever dealt with. They walked me through the setup procedure (without spooning out attitude) until I was up and running, then e-mailed me detailed instructions about the manual dial procedure that's not covered in the manual. (Konexx should include this information in their manuals, or at least on their web site.)

The Konexx line fills a special need extremely well. If you ever find yourself in an isolated locale with nothing more than an old pay phone for connectivity, you'll be glad to have one of these black boxes for staying in touch with your e-mail comrades.

— Daevid Vincent

boot verdict

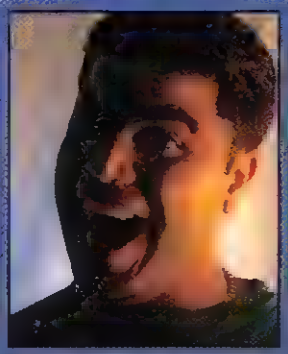
7

PRICE: Koupler $149; Office Konnector $119; Mobile Konnector $149
COMPANY: Konexx
PHONE: 619.622.1400
URL: www.konexx.com

These testimonials are from some people who have played Soultrap...

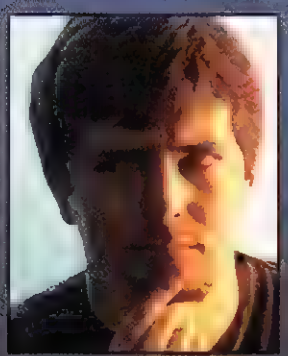
"It's amazingly addictive once you start playing you won't be able to stop."

"It's not a Soul Blade or Tomb Raider console system, but it is the first time I've really seen it done well for the PC. Two big thumbs up!"

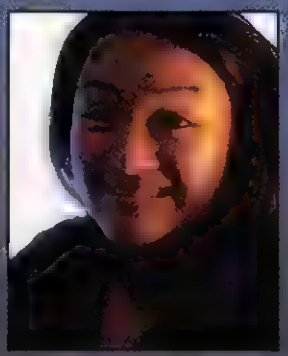


"The best part about playing Soultrap was I played was really cool. There's even a smart camera that picks the best view for you!"

"The Soultrap world is incredible, so real the fact that you can change it makes it truly..."

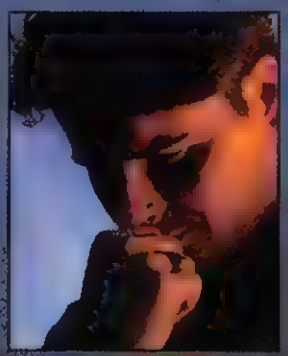


"You look up, down 360 degrees around you. I've never seen anything like it!"



"Stunning 3D graphics, an amazing soundtrack and unmatched playability. I really didn't think you could get this kind of experience on a PC!"

"With those moving platforms you really feel like you're in some kind of virtual space!"



"It's the only 3D game I've played that has a large amount of strategy built into it - its not just another mindless shoot 'em up!"

...But don't believe everything you read. Experience it for yourself.

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Microforum

S/W

boot KICK-ASS! PRODUCT

Expression

An artistic movement

Try it out! demo on the bootDisc

A computer and the right software can make anyone look like an artist. Problem is, there's only so much you can do with a simple drawing program's shapes; vector-based programs are arcane; and raster-based paint programs are so unforgiving. Enter *Expression*.

Now it can be truly said: Anyone can be an artist. Anyone with a PC, that is. And a pressure-sensitive stylus and tablet wouldn't hurt either.

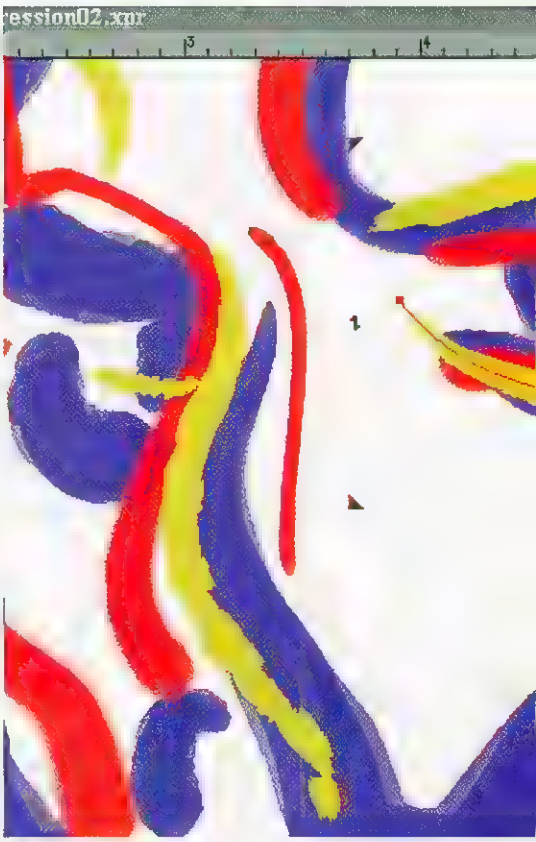
The miracle of *Expression* is that it combines the best of all the different types of illustration software into one versatile tool. In fact, *Expression*'s synergy exceeds most any illustration software out today.

Enough hype. *Expression* is a vector-based, natural-media illustration app that supports pressure-sensitive drawing tablets. That means you can simply pick up your stylus, select a brush from the palette of predefined strokes, and start drawing. Don't like that line? Don't hit control-Z yet. Try changing the point size in the Paint Style palette, or the color from the Color palette, or one of the 350 brush styles. Still not digging your line? Go up to the Object Selection tools in the toolbar, then click on your line. A red line littered with control points appears. Fractal Design calls this "Skeletal Strokes" technology. By converting nodes from corner to curve, cranking their tangent handles, and repositioning points on the line, a brush stroke in *Expression* becomes completely malleable. Bend it, shape it, define it; no need to delete it.

Natural-media illustration software, such as Fractal Design's *Painter*, has always created amazing effects at the touch of a button. Everything from a bamboo brush on a loose-grain paper to ball point pen on wax paper could be simulated. Problem was, once a line was laid, the only recourse was to dig into the multiple-level undo to edit the line, undoing all subsequent steps as well. This virtually eliminates editability from the art. In contrast, *Expression*'s vector-based lines remain totally editable.

Once a line has been laid down in *Expression*, you can switch to the Node Select tool to tweak control handles or move controls points. Of course, you may prefer doing this in Paths mode (below) to more clearly see what you're doing.

Other advantages inherent to vector-based documents are the much smaller file sizes produced (relative to comparable rasterized images), and resolutions limited only by the output device. While an Adobe *Photoshop* file can be enlarged within the program, the interpolation used to fill the voids created between existing data tends to produce choppy, mottled images. *Expression* plots only relative points, their control handles, and the styles applied to each element. A 54K *Expression* file exported to *Photoshop* balloons to 1,459K at equal size and resolution, but size *and* resolution can be increased as needed, so a minute file conceivably could contain a mammoth image.



Strokes in *Expression* can have varying degrees of transparency, which adds to the natural-media experience and distinguishes the program from its vector-based competition.

Expression is no replacement for *Photoshop*, though. It cannot acquire, import, or edit raster images. But *Photoshop*'s sister program, *Illustrator*, better watch out. With a powerful host of Bézier drawing tools, including polyline and b-spline controls, *Expression* combines layers, shape blending, miter control, and sophisticated techniques such as compound creating, where open areas in complex grouped images are defined. Even text is fully supported, with type-on-a-path, leading control, and conversion to Skeletal Strokes for TrueType and Type 1 fonts.

Coming Soon: Detailer

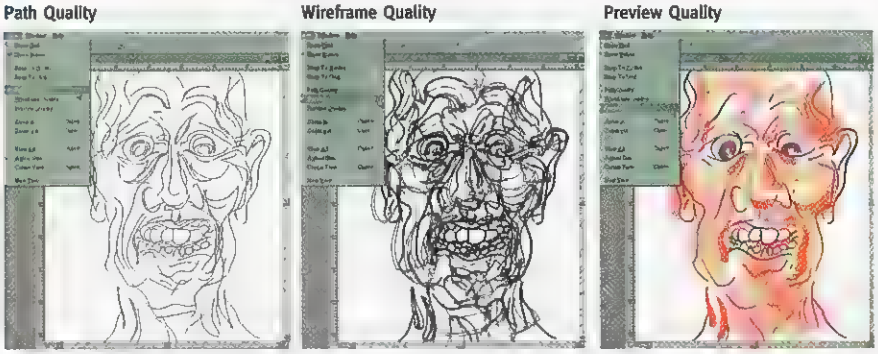
Detailer is coming down the Fractal Design pipe. This "3D Paint Program" will enable you to create texture, bump, and surface maps directly on 3D models. Using traditional tools, you'll be able to paint colors, textures, highlights, reflectivity, and glow directly on your wireframe models in real time; with support for cylindrical, spherical, cubical, pass-through, and implicit U-V mapping. Mapping controls will include resizing and resampling maps, adjusting scale, and moving map seams.

2D artists can use *Detailer* to create objects in correct perspective from the program's library of primitives, which can then be imported into any illustration/image-editing application.

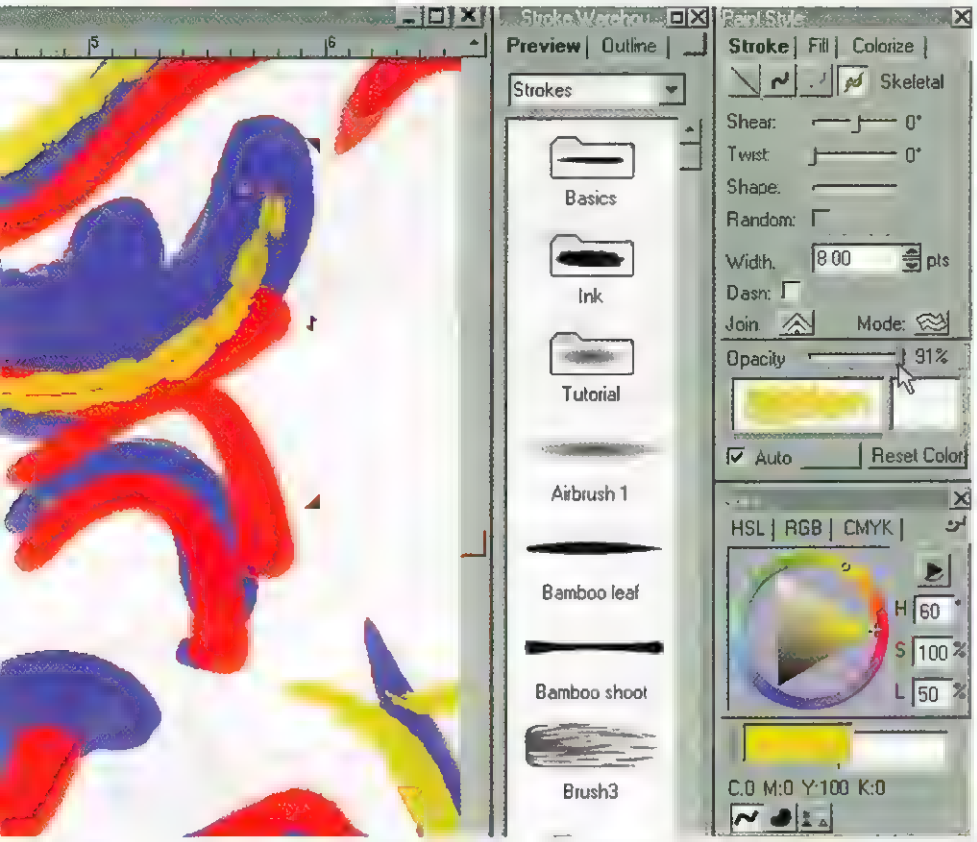
Slated to sell for $449 when it hits the shelf in the first quarter of 1997, *Detailer* imports and exports a slew of 3D and 2D file formats, and, of course, comes stock with the natural-media brush effects that are a staple of Fractal Design's software.

— *B.D.*

Path Quality | Wireframe Quality | Preview Quality



***Expression* has three modes to view files in: Paths (which is best for fine tuning complex files and saving the massive redraw time they incur); Wireframe (which rapidly becomes a mess); and Preview (which provides near real-time feedback of the final image).**

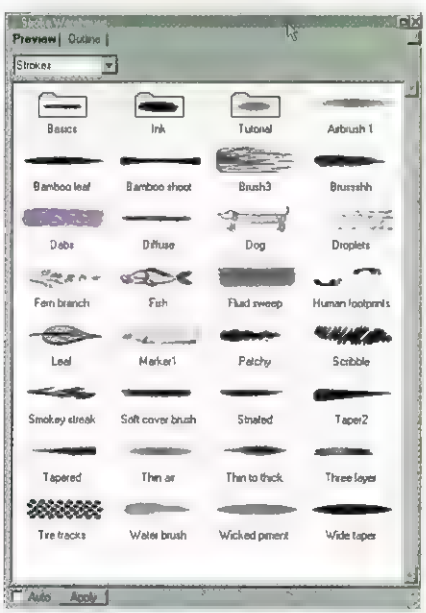


Pen movement is acceptably responsive, pausing only slightly at the start of a stroke, and the lines generated are fairly smooth. This is especially surprising given that the program is calculating the points and curves on the fly; some past programs have struggled with this. Of course, you could make smoother lines with a better economy of control points using the Bézier drawing tools provided, but the instant feedback of stylus and paint is where the real magic occurs.

I can come up with only two minor gripes: Like all of Fractal Design's software, *Expression*'s controls are spread across a bevy of palettes that assumes the user has a 20-plus inch screen. In comparison, *Photoshop* is graced with an economy of these screen hogs. This is largely a personal taste issue, I like to look at my work—not my tools. Secondly, nobody is likely to enjoy the long redraw times after a built-up image is zoomed in or out. Each line must be laid again, like a stop-motion synopsis of the image being recreated, and a complex image can take up to two minutes to redraw.

Still, this is a small price to pay for an innovative program that delivers the best of two worlds. Once you convert a crayon sketch into a watercolor, and then into an oil painting—all by just changing the stroke definition—you'll see the magic of *Expression*.

— *Brad Dosland*

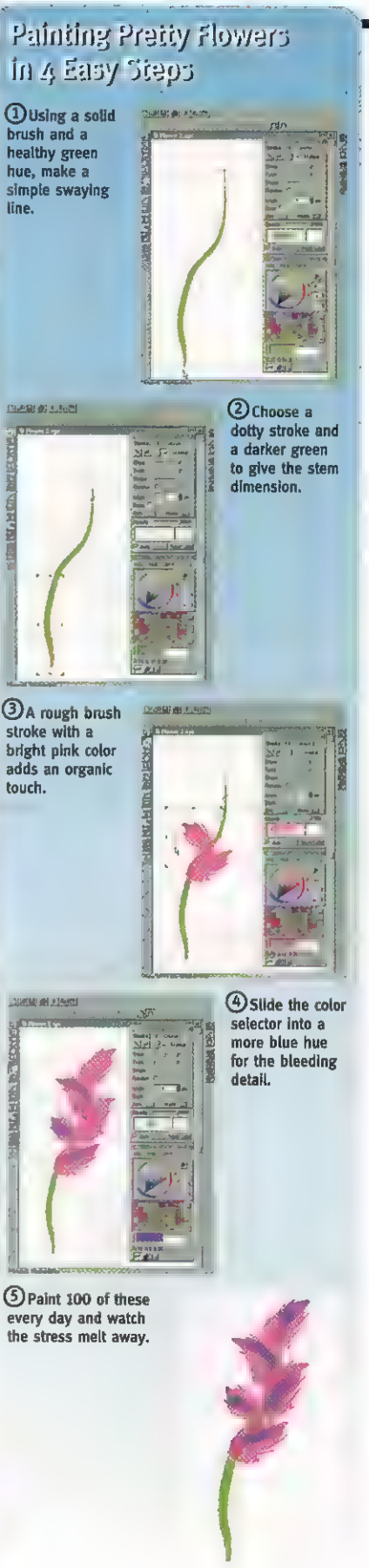


Expression **comes stock with oodles of brush strokes and graphic elements that can be manipulated in the same manner brush strokes can. The dachshund is particularly practical.**

boot verdict

PRICE: $449
COMPANY: Fractal Design
PHONE: 800.846.0111
URL: www.fractal.com

Painting Pretty Flowers in 4 Easy Steps



1. Using a solid brush and a healthy green hue, make a simple swaying line.
2. Choose a dotty stroke and a darker green to give the stem dimension.
3. A rough brush stroke with a bright pink color adds an organic touch.
4. Slide the color selector into a more blue hue for the bleeding detail.
5. Paint 100 of these every day and watch the stress melt away.

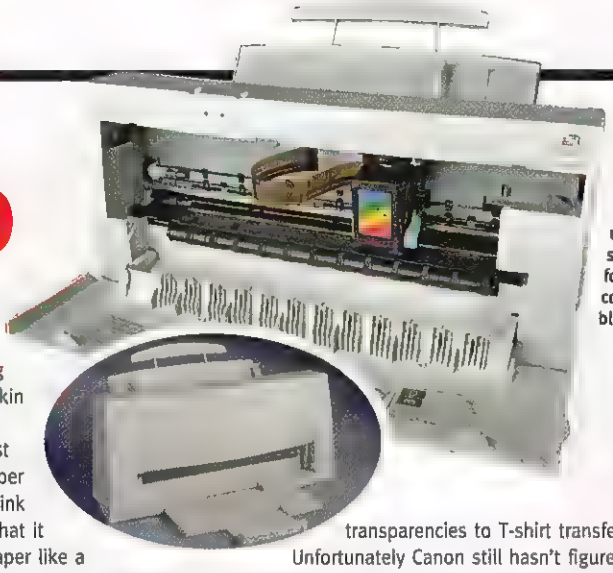
H/W

See it on boot Net www.bootnet.com

Check out our web site for print samples.

Canon BJC-4550

More than a fizzle; less than a bang



The Canon BJC-4550 uses a single tank for all its colors except black.

Canon's latest color printer is something of a yawner, despite its new neon and photorealistic ink formulas.

The printer delivers 720x360dpi and speeds of 1ppm for color, and 5ppm for black and white, which makes it a speed demon compared to the pokey Alps MD-4000 (see review on page 111). But the BJC-4550 simply can't compete with the quality of the Alps' color graphics or text.

The BJC-4550's cartridge carrier holds either two separate ink tanks (one for cyan, magenta, and yellow; one for black) or one large reservoir of either color or black ink. Single pass printing accounts for the printer's speed, but its blacks look more like a dark gray. Worse, text printouts look jagged and fuzzy. If you're looking for a text printer, buy a good laser printer for about the same price.

Canon's new photorealistic ink was specifically designed to reproduce the continuous tones found in photographs, but the results weren't especially impressive. The ink didn't register accurately—skewing yellow and giving skin tones a jaundiced look. Plus, you must use high-quality paper because the photo ink goes on so heavy that it saturates normal paper like a Magic Marker. And the photo ink is expensive, at around 47 cents per page with 15 percent coverage, according to Canon's estimate. The color and neon inks both cost about 14 cents per page and black ink runs about 4 cents per page.

The neon ink is fun, especially when viewed under a black light, but the BJC-4550 struggled with dark colors. Prints exhibit serious banding problems, with white gutters striping across the page. The problem disappears when you switch to Canon's high-resolution paper, but images still come out dark.

In terms of specialty stocks, the BJC-4550 handles everything from backprint film to transparencies to T-shirt transfers.

Unfortunately Canon still hasn't figured out how to stop its inks from smearing when exposed to moisture.

After being wowed by Alps' hot new printer/scanner combo, the BJC-4550 left me cold. Aside from tabloid-sized paper handling, Canon just doesn't have much new to offer this time out.

— *Michael Brown*

boot verdict

PRICE: $499
COMPANY: Canon Computer Systems
PHONE: 800.423.2366
URL: www.ccsi.canon.com

S/W

After Dark 4.0

Bad news or Bad Dog?

Try it out! demo on the bootDisc

Modern monitors no longer require cutesy animations to protect them from phosphor burn-in, so why is *After Dark* up to version 4.0? Simple. Berkeley Systems keeps adding fascinating features to the venerable "screen saver" that catch the eye and show off what's possible with the PC.

After Dark's ageless interface grants up-to-the-minute updates with a dedicated Internet connection.

Armed with 20 new animated displays destined to taunt and delight, Berkeley Systems has interwoven a PointCast Network-esque online news source that activates when your screen goes to sleep.

Between the usual assortment of mindless 3D-rendered cartoon characters, interlaced CyberSchlock, and cornucopia of cascading colors lies the innovative Magic Turtle—a user-programmable screen saver that utilizes a high-level icon-based language not unlike Logo. An Internet account, web browser, and active Win95 dial-up network are all you need to take advantage of *After Dark Online*'s fact-filled features.

Working closely with five major publishing houses, your customizable newsletters range from front page news (*USA Today* and *The Wall Street Journal*), and stock reports (via the DBC Financial News), to computer news (from a direct link to ZD Net). If something interests you, click and launch your favorite web browser directly into that publisher's web site.

Updates can be performed manually or at automated intervals, so you can tailor information gathering to suite your needs and capabilities. A dedicated Internet connection is recommended for 24-hour up-to-the-minute updates. Still, downloading updates with a 28.8 modem took only a little more than a minute for a typical single channel update.

Get the latest news... while saving your screen from phantom phosphor burn-in.

While a T1 line constantly sucking down updates really makes this module glow, and the initial offering of newsletters is sparse, this engaging "screen saver" is typical of *After Dark 4.0*.

The screen saver (and *After Dark* in particular), is a study in staving off obsolescence through creativity and ingenuity.

— *Andrew Sanchez*

boot verdict

PRICE: $29.99
COMPANY: Berkeley Systems
PHONE: 800.713.7146
URL: www.berksys.com

Sure, there are cheaper PC and Mac game controllers. But if you're ready to get serious, you need the high-quality, built-to-play-rough peripherals from CH Products.
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joysticks, throttles, flight yokes, rudder pedals, and other controllers are born in the USA, and made to take the heat of any battle, race or game you throw their way. So put on your game face, get down to your computer dealer and grab the game controllers made for serious players.
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FlightStick
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CH Gamepad [PC & Mac*]
CH Pedals [PC & Mac*]
Pro Pedals
F-16 FighterStick [PC & Mac*]
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• Media Play • Micro Center • Montgomery Wards Electric Avenue • Nobody Beats the Wiz • Office Max
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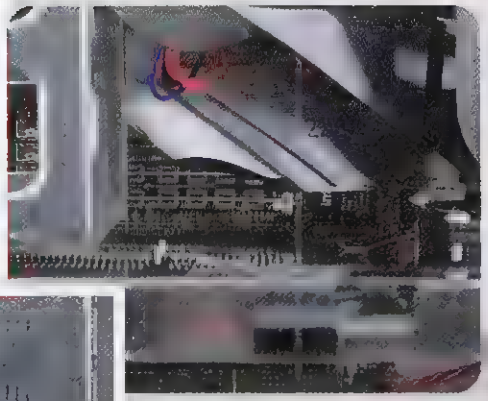
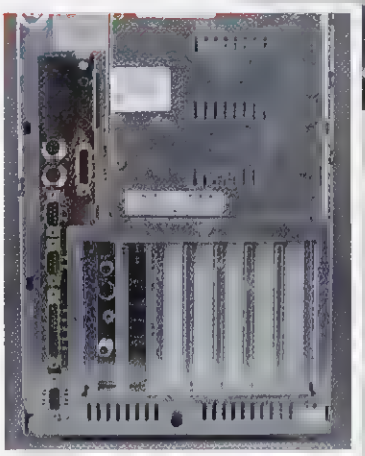
• Susteen • Ultimate Electronics • United CD-ROM • Wal-Mart

H/W

AST Advantage 9312 Communications

No advantage here





Behind This Secret Panel

Open the door on the back of the 9312 to gain access to the rear expansion bays, and you'll discover the bays can be pulled out for easy access (there are also two bays at the front). Good thing too, since the bays and cables obstructing the motherboard make SIMM additions extremely difficult.

AST bills the 9312 as "the most complete communications solution for the home," but with only a 28.8Kbps fax/modem, whose home are they talking about? Probably not yours or mine.

Still, given its $2,299 list price, the 9312 sports some impressive alphabet soup: 166MHz Pentium, 24MB of EDO DRAM, 8x CD-ROM, 2.5GB hard drive. Toss in a bevy of bells and whistles and the "communications solution" is tempting. But overall, the 9312's performance was disappointing.

Most performance problems stemmed from the sub-par video chipset. AST doesn't provide VESA 2.0 drivers, so we had to use SciTech's *Display Doctor* to kick *Quake* into 640x480 resolution. And in *Descent II*, the 9312 couldn't muster the frame count of a View-Master. With only 1MB of video memory, 16-bit graphics top out at just 800x600 pixels. The onboard S3 Trio V+ video chipset and meager 1MB of memory may suffice for low-end 2D applications, but it isn't suited for the applications *we* want to run. And, try as we might, Adobe *Premiere 4.2* simply would not run at all on the 9312 and we were forced to use version 4.0 for our tests. (We called AST for help, but they were unable to offer an explanation nor a solution.)

Yamaha's OPL4 audio chip offers bare-bones wavetable synthesis at best; a shortcoming compounded by the listless Labtec LCS-1020 speakers provided. Listening to the muffled sounds these plastic boxes put out is enough to make you believe that AST wanted the system to *really* sound like a telephone.

But let's talk about what the 9312 *can* do. Nifty gadgetry includes an analog color video camera and a video capture/TV tuner card. Using Intel's Video Phone technology, the 9312 delivers video compression, audio compression, and full-duplex speakerphone capabilities. The 9312 is also equipped with Intel's Intercast technology, allowing you to view the HTML documents embedded into the vertical blanking intervals of a handful of television broadcasts. With Intercast, you can download documents pertaining to the show you're watching, or engage in real-time chats on the Internet.

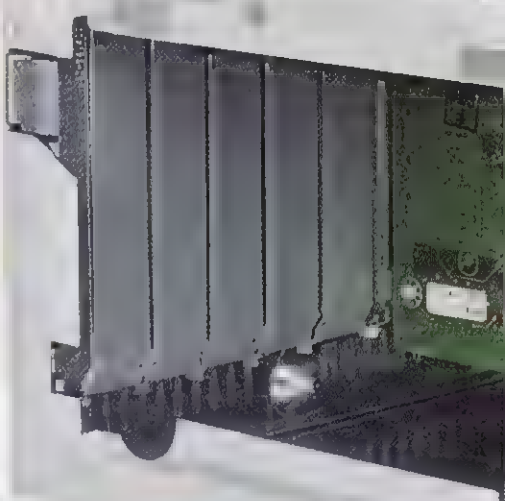
Someday, you're going to want a USB peripheral, but the 9312 has no USB ports. Plan on installing a PCI-based USB interface card. But since both of the 9312's *two* PCI slots are already occupied, plan on yanking the video-conferencing capabilities—the machine's raison d'être—to plug in a USB interface.

Video teleconferencing is cool technology, but the 9312 sacrifices all the other cool technologies to deliver it.

— Bryan Del Rizzo

DOUBLE TAKE

THE IDEA BEHIND THE 9312 IS SOUND, BUT THERE ARE ONLY SO MANY CORNERS YOU CAN CUT BEFORE A SYSTEM BECOMES WORTHLESS. AND THE LACK OF OPEN PCI SLOTS IS THE FINAL INSULT.
– S.D



A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

under the hood

the brains

CPU.....166MHz Intel Pentium
External Cache.....256K pipeline burst
RAM.....24MB EDO DRAM (128MB max)
Video.....S3 Trio V+ with 1MB EDO DRAM on the motherboard

the brawn

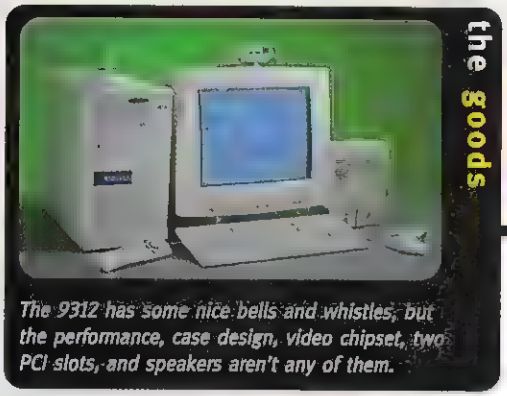
Hard Drive.....2.5GB IBM EIDE
CD-ROM drive.....Toshiba 8x IDE-ATAPI
Expansion.....5 ISA slots (all open), 2 PCI (both filled)
Fax/Modem.....28.8Kbps with full-duplex speakerphone

the beauty

Monitor.....AST Vision 7L model 17-inch ($499 option)
Sound.....Yamaha OPL4 wavetable/FM hybrid
Speakers.....Labtec LCS-1020

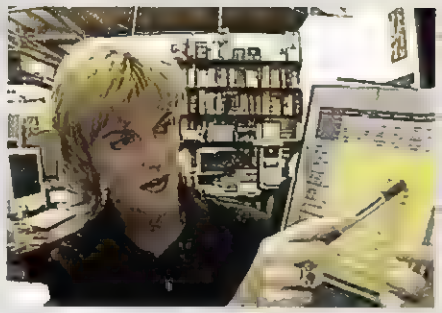
the bundle

Mayo Clinic Family Health • The 1996 Grolier Multimedia Encyclopedia • Intel Intercast • Lotus Smart Suite • Quicken SE • The Little Samurai • Freddi Fish And The Case Of The Missing Kelp Seeds • Math Blaster 2: Secret Of The Lost City • Descent II: Destination Quartzon • Fury³ • Virtual Pool • Director's Lab



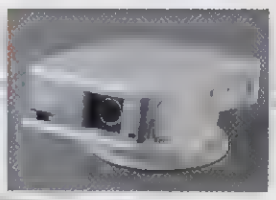
the goods

The 9312 has some nice bells and whistles, but the performance, case design, video chipset, two PCI slots, and speakers aren't any of them.



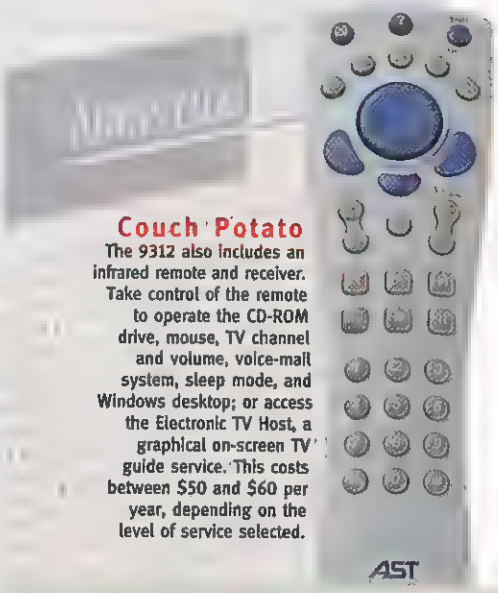
You Oughta Be In Pixels

Intel's Video Phone technology can work some serious double duty. While picture quality in real-time live video transmission can get a bit on the pixelicious side, the Video Phone's Snapshots option can grab some seriously clean and crispy high-color video snapshots, as these screenshots show. Adjust the camera's sharpness and contrast, and you're good to go on the videophone. Mr.DeVille, I'm ready for my close-up!!!



Smile, You're on Candid Camera

The analog video camera sports a low-profile design and can be tilted and swiveled. The camera includes controls for white balance, sharpness, balance, and focus. Video throughput maxs out at about 12fps, but drops to as few as 4fps when capturing motion. Frame rates are also dramatically affected by the window size (176x132 or 352x264 pixels).



Couch Potato

The 9312 also includes an infrared remote and receiver. Take control of the remote to operate the CD-ROM drive, mouse, TV channel and volume, voice-mail system, sleep mode, and Windows desktop; or access the Electronic TV Host, a graphical on-screen TV guide service. This costs between $50 and $60 per year, depending on the level of service selected.

Pineapple Upside-Down Cake

The 9312 won't win any industrial design awards with its blocky minitower case, which uses the same wacky design as the 9314 (reviewed in *boot* 03). Open the case, and you'll discover the expansion cards are mounted upside down, with the cooling fan and SIMM sockets partially obstructed by ribbon cables. The biggest design flaw? Five free ISA slots, but only two PCI slots, both already occupied by the video capture card and the 28.8Kbps modem. So much for expansion.

\+

- Color video camera
- TV tuner/capture card
- Intercast equipped
- Inexpensive

\–

- Underpowered video
- Weak audio chip
- Only 2 PCI slots both occupied

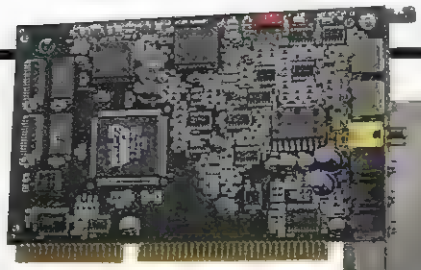
boot verdict

PRICE: $2,299
COMPANY: AST
PHONE: 800.876.4278
URL: www.ast.com

H/W

EasyCam

Say "Cheese!"

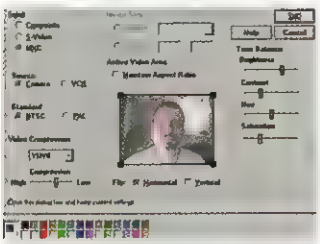


The interface card doesn't require any IRQs or DMA assignments, so installation is painless.

The image quality of the EasyCam is acceptable, but a normal ambient light produces dramatic effects.

The EasyCam Video Conferencing Kit combines a color digital video camera, ISA interface card, and software to provide a full-featured desktop video communications system. It's easy to set up, perfect for the Internet, and it's fun.

I was prepared to do a little wrangling with my PC to get this device up and running, but was surprised by how smoothly the installation went. The interface card didn't require any interrupt, I/O address, or DMA channel assignments, so the system was up and running in minutes.



Select the video compression type and video source via the software interface.

The palm-sized camera looks like a tennis ball with stubby wings, and rests on a contoured base where its viewing angle can be easily adjusted. The power switch and contrast buttons are on the back of the camera, as are switches for backlight compensation and positive/negative image selection. These controls should have been mounted on the front, so you don't have to pick up the camera to make adjustments.

The video camera feeds the card through a proprietary plug, but the card also has inputs for S-video, composite video, line-level audio, and a microphone—and there's also an audio-out jack. The card handles full-duplex audio and video—useful for video teleconferencing and *CU-SeeMe* applications. You can also use it for capturing full-motion or still-frame video. Image quality is good, but the EasyCam requires flat, bright lighting; a condition that's not always easy to satisfy in a home environment.

Using the bundled *VidUtil* app, you can capture single frames or streaming video. Video can be saved as AVI files; still images as bitmaps. The software captures still images to Win95's clipboard, so you have to paste each capture into a paint program before you can grab another. Maximum resolution is 640x480, with color depths ranging from 8 bits to 24 bits.

Philips bundles all the apps you need to capture and edit video and teleconference over the web, including *CU-SeeMe Enhanced*, *Digital Video Producer*, and *PixelShrink* for MPEG video encoding.

— Bryan Del Rizzo

boot verdict

PRICE: $499 with camera; $299 for capture card only
COMPANY: Philips Electronics
PHONE: 800.235.7373
URL: www.pps.philips.com

S/W

Toonstruck

Who Framed Reverend Jim?

Toonstruck looks fantastic; and you'll encounter a plethora of animated characters.

Toonstruck is an exhilarating romp through cartoon land. It may look like a cute, cuddly graphic adventure game, but that's just a disguise for its darker mentality. Cartoons are, after all, evil.

Similar to the movie, *Who Framed Roger Rabbit*, *Toonstruck* combines traditional cel animation with live-action video. You play the animator of a saccharine Saturday morning cartoon show called "The Fluffy Fluffy Bun Bun Show," who finds himself trapped in his own cartoon world. To escape, you must explore three wacky kingdoms populated by an entertaining cast of bizarre characters.

Spike the Clown isn't just a regular bozo. He's twisted.

The first half of the game has you on a scavenger hunt, traversing the colorful landscape (you'll explore a castle during the second half). Along the way, you bump into thoroughly warped cartoon characters including Punisher Polly, a sheep in S&M clothing (whip included); and Spike, the twisted clown who has a penchant for torturing cute balloon animals.

Toonstruck isn't difficult to play—you click around, exploring scenes and using your inventory—but the puzzles aren't dead giveaways either. Remember, things in a cartoon world tend to be a tad extreme. *Toonstruck* possesses a relatively nonlinear path, and is peppered with shots of irreverent, sometimes adult, humor.

With more than 100 hand-painted scenes, *Toonstruck* looks gorgeous! The live-action sequences of actor Christopher Lloyd, (who portrays the animator, Drew Blanc), were filmed against a green screen, and then merged with the animation using special motion tracking and morphing techniques. These touches really pay off, and you'll notice and appreciate the game's fluidity immediately. The integration of the live-action character is seamless, and adds depth to the adventure. *Toonstruck* sounds terrific too, thanks to additional voice acting by David Ogden Stiers, Tim Curry, and Dom DeLuise. Particularly notable is Dan Castellaneta, the voice of your acerbic sidekick, Flux Wildly.

Toonstruck is a perfect blend of twisted humor, challenging puzzles, and stunning aesthetics.

— Bryan Del Rizzo

boot verdict

PRICE: $49.95
COMPANY: Virgin Interactive Entertainment
PHONE: 800.874.4607
URL: www.vie.com

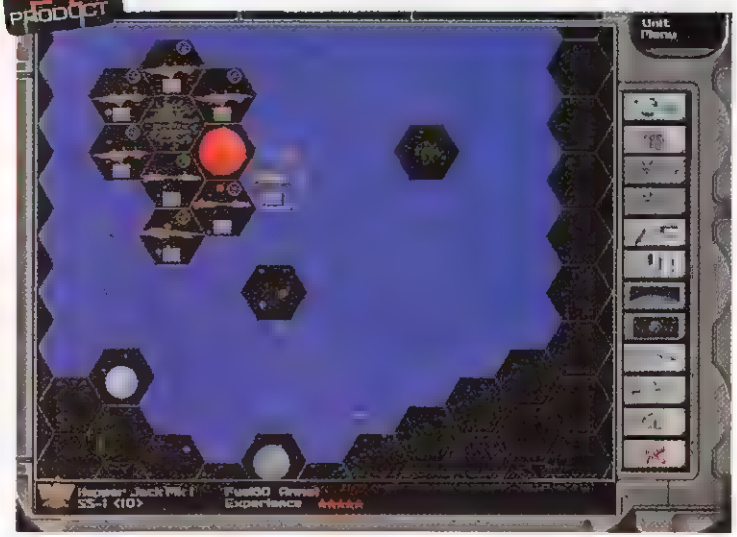
S/W

Try it out! demo on the bootDisc

boot KICK ASS! PRODUCT

Star General

Allied General *meets* Buck Rogers



Star General's simple interface makes it a joy to play.

Star General bears a striking resemblance to its *General* kin (*Panzer General, Allied General, Fantasy General*), but this sci-fi variation offers up enough new features, and packs enough firepower, to satisfy anyone who loves the smell of fusion cannons in the morning. Fans of strategy games won't be disappointed either.

At its core, *Star General* is really a game of intergalactic conquest. War may be grand, but in *Star General*, it's also vastly more complex, especially since battles are now fiercely fought both on the ground *and* up in the cosmos. *Star General* also breaks new ground by being the first game from SSI that supports seven-player simultaneous TCP-IP Internet and IPX (LAN) play, as well as two-player direct-connect modem support.

Start by choosing from the seven alien races, including: the barbarian Khalian, feline Hressa, insectoid Xritra, fascist Schleinel, reptilian Dragonian, deceitful Cephians and of course, the lowly human. Each race has specialized characteristics, including a personalized AI, and different combat units to aid them in battle. For example, the Schleinel are privy to the powerful Death Blossom, long-range artillery that preys upon crippled units; while the Khalian Raiders are fast-armed infantry units, specialists in destroying production units. All combat units have their own strengths and weaknesses, but technologies can always be upgraded—so don't become *too* complacent.

Build your fleet for the conquest! You gotta love the smell of fusion fire in the morning.

Star General includes more than 20 strategic scenarios, but all have the same ultimate premise—find the opposing space fleets through the blackness of space, and obliterate their forces from the galaxy. The combat fighting is fierce, and it'll take your best ship to destroy the opposing fleet. You'll be able to choose from more than 90 beautifully rendered 3D ground-force, air-force, and space vehicles, such as battleships, missile boats, destroyers, recon transport ships, as well as infantry, mine, hunters, heavies, and assault vehicles.

In addition to the raw combat, you're also responsible for further developing the resources necessary to conquer new worlds. *Star General*'s intuitive point-and-click interface ensures smart management is never more than a mouse click away. Although the game isn't hard to play, it *is* hard to get started. Familiarize yourself with the manual before commencing combat, or you may find yourself hopelessly frustrated.

Star General is a war game, rich in visuals and sound. Its stunning array of space combat and enhanced cinematic battle scenes are outstanding. The game engine will appeal to a lot of strategy war gamers; and, with its two-level combat system and more than 100 planets to conquer, *Star General* just may be one of the best war games of 1997.

— *Brad Craig*

boot verdict

PRICE: $59.95
COMPANY: Strategic Simulations
PHONE: 408.737.6800
URL: www.ssionline.com/cgi-bin/start

9

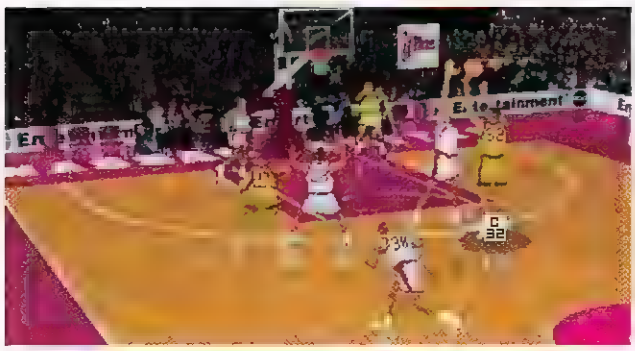
Star General Hints and Tips

- To launch your empire into space, purchase one Biodome, Mine, Factory, Plant, and a Space Dock. You should also purchase a Technology Facility (to upgrade your current technology), and a Military Facility.
- Take out opposing players' Space Docks as soon as possible, to prevent them from launching more ships.
- After you've destroyed the alien fleet, move your transport ship adjacent to the opposing planet. But remember: transport carriers are important for winning the game—protect them at all costs.
- Deploy your troops close to a landing pad, near a main city.
- Use your fastest units, such as Assault Vehicles, to take the cities. You may want to send two transport companies down to the surface.
- Don't underestimate the enemy—take plenty of firepower down to the surface.
- Use your mining resources to pay for your military upgrades, because cheap technology makes you extinct fast.

S/W

Try it out! demo on the bootDisc

H/W



Choppy animation and substandard gameplay make it a rough road to the Final Four.

NCAA Championship Basketball

Dribbling across midcourt

Don't you hate it when you're hyped for hoops and it's raining outside? Forecast reads "No chance of sun for three weeks." That's how I felt *after* playing *NCAA Championship Basketball*. In a word: frustrated.

This sim of the collegiate game has all 64 Div 1 teams with authentic logos and colors. No names though. To preserve the "purity" of the college game, the real stars—the players—get as much recognition in this game as their counterparts get of the gate at a cross-town showdown. Zip. You won't find Camby, you won't find O'Bannon, you won't find the next Iverson or Allen or Wallace. What you will find is a bunch of phony names with stats that *occasionally* match their real-life rosters.

On screen, those players rush the court with 100 moves comprised of more than 4,500 frames of Silicon Graphics animation. So why do they all look so chunky that Jenny Craig should be the team's trainer? It's pixel city on the court. The only indicator of the graphics SGI pedigree is the player's reflection on the hard courts, instead of black splotch shadows. The camera is fixed at midcourt, swiveling up and down the court with the "action." The moves are jerky and gameplay is so slooow, it's hard to just settle in and enjoy the action that gamers yearn for. It does, however, provide that "Branch McCracken" feeling for those content to run the game from the bench.

As a coach, *NCAA* provides a load of cool options. You can draft and mold high school hoopsters into prime-time players that Dicky V. would be proud of. Create custom players by selecting uniform number, name, skin color, and shooting hand. Some more specs would've been nice here, such as height, weight, and sheer dunkitude.

Two players can match up head-to-head on the same machine (use gamepads—the keyboard is virtually unplayable), but there's no network play options.

Despite its flaws, such as the invisible walls that keep the ball from going out of bounds and the computer D that makes it nigh impossible to penetrate to the rim, *NCAA* can still be an entertaining college hoops sim, but playing in the rain might be more fun.

— Jay Boor

boot verdict

PRICE: $59.99
COMPANY: GTE Entertainment
PHONE: 800.483 8632
URL: www./im/gte com

ATI 3D Xpression+ PC2TV

For TV and 2D, not 3D

The 3D Xpression+ PC2TV packs a lot of power, but it's not a leader in 3D acceleration.

The 3D Xpression+ PC2TV is almost everything you could want in a graphics card. But competition is fierce, with advances in technology occurring at a furious pace. If you're looking for the best 3D graphics accelerator, this isn't it. But if your needs are more diverse, this card may fit your bill.

The 3D Xpression+'s most exciting feature is its ImpacTV chip, which provides scaled, flicker-free composite and S-video output of the computer's display so you can hook your PC to a big-screen television. ATI's 3D Rage 2 chip is also onboard, providing solid 3D acceleration, DOS and Windows performance rivaling the latest 128-bit accelerators, and support for high resolutions and color depths.

The Rage 2 is much faster than the original Rage; in fact, its 3D performance is doubled. Nonetheless, it still doesn't present a serious challenge to Rendition's Vérité or 3Dfx's Voodoo Graphics chipset.

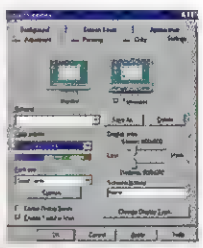
In the 2D arena, on the other hand, the Xpression+'s 4MB of EDO DRAM support resolutions as high as 1600x1200 with 8-bit color at 60Hz, with true 24-bit color support up through 1280x1024 at 75Hz.

The maximum resolution the card can pump out on a television monitor is 800x600, and the max refresh rate is an eye-burning 60Hz. These limitations are imposed by the nature of television monitors, not the card. Turn off the card's TV-out feature and it automatically switches to the highest refresh rate your plug-and-play monitor supports.

We encountered some nasty installation problems and had to remove the Sound Blaster from our test system before it would accept ATI's drivers. The problem is limited to motherboards with older BIOSes, according to ATI; make sure yours is up to date before you install this card. (Older Award BIOSes are particularly susceptible to this conflict.)

Slap on ATI's optional TV tuner/video-capture daughterboard ($129), and the 3D Xpression+ PC2TV becomes a great home media station. If you're looking for a multipurpose video card, this is it.

— Chris Dunphy



ATI's display utility is one of the best we've seen.

The Xpression+ will take your PC games to the big screen.

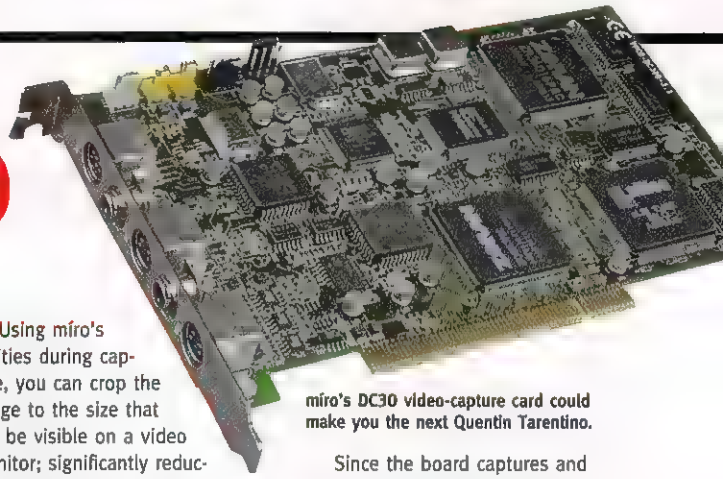
boot verdict

PRICE: $189 with 2MB; $219 with 4MB; $129 for optional TV tuner/capture daughterboard
COMPANY: ATI Technologies
PHONE: 905.882 2600
URL: www.atitech.ca

H/W

míroVideo DC30

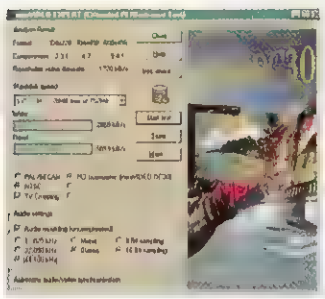
Look ma, no dropped frames!



míro's DC30 video-capture card could make you the next Quentin Tarentino.

Anyone itching to produce videos on their desktop needs the míro-Video DC30. This PCI card captures, compresses, and edits video in a way that satisfies like a big fat cat licking your scalp.

The DC30 supports full-screen (640x480), full-motion, video capture at 30fps (60 fields/sec). The card's onboard M-JPEG compression chip crunches the resulting bit stream down to an amazing 5.5MB/sec. míro has moved the bottleneck off the card's Zoran chipset and even away from the host's PCI bus: The DC30 captures video as fast as your hard drive can swallow it.



míro's *Expert* utility tests your hard drive to determine the maximum capture rate it's capable of sustaining.

Installation is painless, and once the card is in its slot, you can jump into video editing and capture with the full copy of Adobe *Premiere* bundled with the card. You can use *Premiere* for capturing, as well as editing, but we experienced better results using the simplified interface of *VidCap32* provided with the card. The DC30 is equipped with inputs and outputs for both composite and S-video, but the audio jack functions as both input and output.

Using míro's utilities during capture, you can crop the image to the size that will be visible on a video monitor; significantly reducing traffic on the bus and, ultimately, the size of the file you'll use for editing. After the file has been captured, you can compress it using an M-JPEG compression algorithm to squash it down even more by throwing away image details that don't change from one frame to the next. míro's algorithm is extremely efficient and very difficult to detect.

Since the board captures and plays back full-motion video in real time, a fast SCSI-2 or Enhanced IDE hard drive is an essential component. And the drive had better be spacious; five minutes of video consumes about 500MB of storage.

Even if your system isn't exactly top of the line, the DC30 does such a great job of compression that you will get good results.

— *Sean Downey*

boot verdict

PRICE: $999
COMPANY: míro Computer Products
PHONE: 800.249.6476
URL: www.miro.com

8

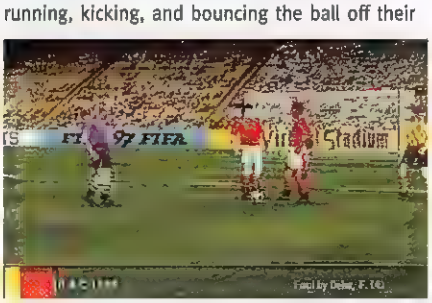
S/W

FIFA '97

Pele would be proud

Soccer's the most popular sport on the planet. Hell, even America's starting to sit up and notice that goofy checkered ball; and *FIFA '97* is the best computer version of the game to date. Somehow, EA manages to improve the sterling gameplay with each successive version.

The graphics haven't been radically upgraded: players are small, but nicely shaped and easy to recognize. They look positively real when running, kicking, and bouncing the ball off their little heads, thanks to incredibly smooth animation. Choose from one of seven camera views, (the Tele-Cam is my personal favorite. It's a slightly overhead three-quarter view that scrolls with the action and is smart enough to follow the players without letting the ball get too far ahead). All game graphics are straight-up sprite-based, and there's no video tossed in to slow the action.



Every year, EA manages to make the best even better. *FIFA '97* is no exception.

FIFA lets you select how you want to control the on-field action, choosing from joystick, mouse, and keyboard options. Once you've mastered the moves, it's time to take on the computer or another player (head-to-head via modem or against up to seven others via LAN). Play either a single exhibition game, a winner-take-all tourney, or a customized season built from a mix of more than 250 international teams and players. You can compete in any of 11 regional leagues (up to 16 teams can be controlled throughout a season). There's also Tournament play at the National or International level. Good sound effects add to the game's immersive feel, as does the realistic weather—ranging from dry as a bone to extremely wet. Skill levels start at Beginner and advance through Semi-Pro to Pro.

Sim soccer stars want to think about the game, not the controls. Once you're up to speed, *FIFA '97* delivers solid gameplay that makes you believe a computer *can* replace the real thing.

The auto-boot disc is full of demos and video clips to watch before getting down to the serious business of scoring, and while enabling the speech option eats up massive acres of hard drive space—it's surely worth it to hear the announcer call the play-by-play. (And with a decidedly British accent too.)

— *Marshal M. Rosenthal*

boot verdict

PRICE: $49.95
COMPANY: Electronic Arts
PHONE: 800.245 4525
URL: www.ea.com

9

H/W

HP Pavilion 7295V

You'll question your manhood

If ferociously fast, bilinear-filtered, perspective-corrected, Gouraud-shaded, texture-mapped action gets you hot and bothered, then Hewlett-Packard's Pavilion 7295V is your ticket to polygon paradise. But if you're looking for a machine to tweak, this box is just a tease.

Equipped with a 200MHz Pentium, 256K of pipeline burst cache, 32MB of EDO DRAM, and a 3.8GB hard drive, the 7295V is leaps and bounds ahead of HP's 7130P (reviewed in *boot* 01). More importantly, its onboard S3 ViRGE 3D graphics accelerator is augmented by a Voodoo Graphics 3D card in one of its PCI slots.

Pop the lid on this puppy and your excitement quickly goes limp as you gaze at the riser board sticking up out of its planar: There are only two PCI slots, and one is already occupied by the Voodoo card. And the thought of having to yank all the expansion cards *and* the riser board just to add SIMMs or swap out the CPU is enough to render you impotent.

On the bright side, HP has provided a generously large fan to keep things cool; and there's a slick swing-out tray for adding an internal 3.5-inch hard drive (in addition to the front-accessible 5.25-inch bay). But apparently HP doesn't think anyone will use these bays, because they didn't bother to include an extra connector on the EIDE interface cable for additional devices. (However, a second power connector is included.)

Forget the new USB peripherals coming out next year, because HP doesn't include USB ports on the motherboard. This isn't a problem right now, because there aren't any USB peripherals available, but that's going to change rapidly—and you probably won't want to sacrifice your last open PCI slot for a USB card.

Syncro Connect software adds speakerphone, answering machine, fax, and videophone receive capabilities to the built-in 33.6Kbps fax/modem; and you can order an optional videophone camera upgrade kit for $299.

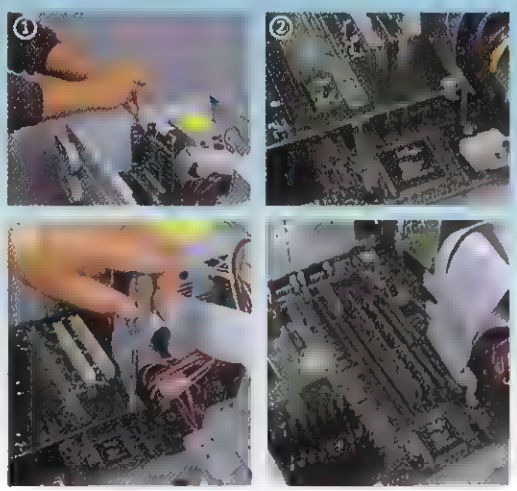
HP didn't provide VESA 2.0-compatible drivers for the ViRGE, so we had to install SciTech's *Display Doctor* utility to drive *Quake* at 640x480 resolution (without the additional software, *Quake* maxed out at only 480x360).

All things considered, the 7295V packs some serious firepower, but the lack of expansion opportunities and the list price (particularly steep considering this "gaming" system doesn't come bundled any gaming peripherals) leave us a little frigid.

— *Andrew Sanchez*

Into the [illegible]

1. Remove all the ISA and PCI cards.
2. Take out the screws on the four corners of the riser board.
3. Pull out the riser board.
4. Plug in the new SIMMs.
5. Repeat steps one through four in reverse order.



Push it Real Good

Prepare for some intense polygon-pushing with 3Dfx's Voodoo Graphics, one of the most powerful 3D accelerators on the market.

DOUBLE TAKE

HP IS ON THE RIGHT TRACK. ORCHID'S RIGHTEOUS 3D CARD IS ONE OF THE BEST GAMING CARDS AROUND, BUT THE 7295V'S MOTHERBOARD NEEDS AN OVERHAUL.

– M.B.

A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

under the hood

the brains

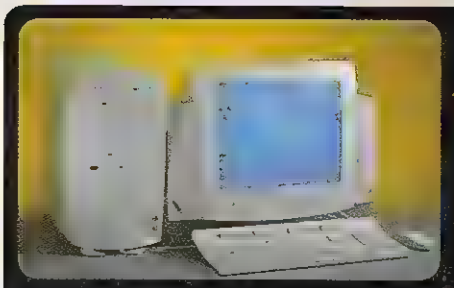
CPU.....200MHz Intel Pentium
External Cache.....256K pipeline burst
RAM.....32MB EDO DRAM (128MB max)
Video.....S3 ViRGE with 2MB EDO DRAM; 3Dfx Voodoo Graphics chipset with 4MB EDO DRAM

the brawn

Hard Drive.....3.8GB Quantum Fireball 3840AT EIDE
CD-ROM drive.....Goldstar GCD-R580B 8x IDE-ATAPI
Expansion.....5 full-length ISA slots (4 open); 2 full-length PCI (1 open)
Fax/Modem.....33.6Kbps AT&T WinModem

the beauty

Monitor.....HP 3859A 17-inch monitor ($749 option)
Sound.....Card Yamaha OPL3-SA on motherboard
Speakers.....Altec Lansing (custom model)



the goods

HP is going after the hardcore gamer with the Pavilion 7295V, but they've missed the mark by making this machine difficult to customize. Two PCI slots (one occupied) just aren't enough.

What a Swinger!

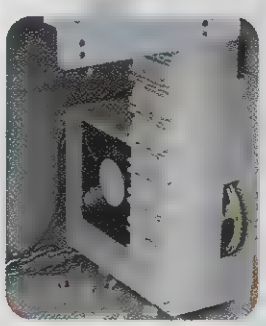
This clever swing-out drive cage is great for adding yet another drive inside the case, but you'll still be frustrated by the lack of any interface cables.

Feed the 3D Beast

The video signal from the S3 ViRGE chip is piped through the Righteous 3D card, then the Voodoo feeds the mixed video to the display.

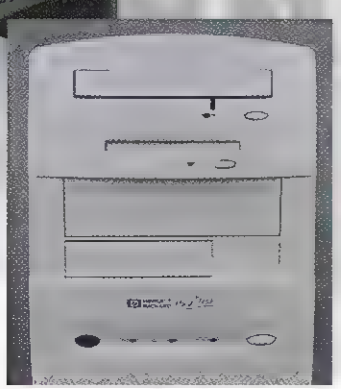
How Many Slots?

What happens if you need to add a SCSI host adapter? Or a new video card, or a LAN network card, or a... Basically, you're screwed.



Chill Out

With two fans and a heat sink, the P200 is chilled enough to make Frosty the Snowman envious.



Where are You Hiding?

Front-accessible 5.25-inch and 3.5-inch drive bays hide behind this removable panel—perfect for a removable media drive or a CD-R drive. 'Tis a pity HP doesn't provide interface cables for them.

+	–
•ORCHID RIGHTEOUS 3D 3DF/X 3D ACCELERATOR	•S3 VIRGE CHIP LACKING TRUE VESA 2.0 COMPATIBILITY
•PENTIUM 200MHZ	•ONE FREE PCI SLOT
•VOLUME CONTROL INTEGRATED INTO HP MULTIMEDIA MONITOR	•YAMAHA OPL-3SA SOUND CARD
•BEEFY FANS AND HEAT SINK ON/AROUND CPU	•PAIN IN THE BUTTOCKS TO UPGRADE CPU
•EASY-TO-REMOVE DRIVE CARTRIDGE	•OTHERBOARD NOT COMPATIBLE

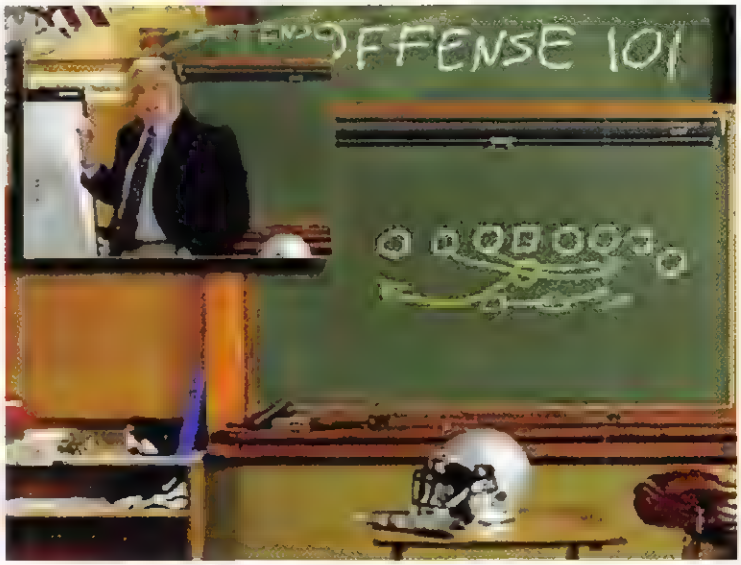
boot verdict

PRICE: $3,199 ($749 for optional 17-inch monitor)
COMPANY: Hewlett-Packard
PHONE: 800.724.6631
URL: www.hp.com

S/W

The Hundred Yard **War**

A war gamer's look at four new PC football games

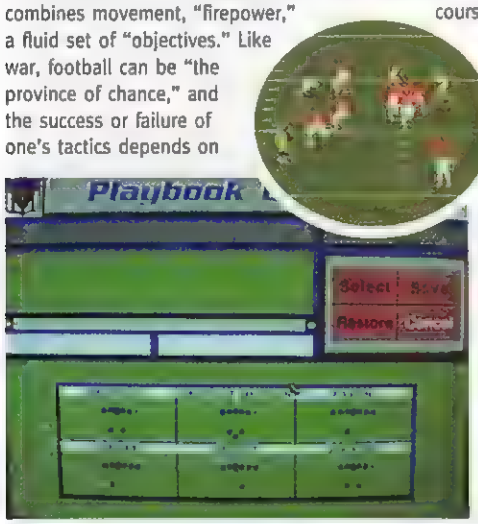


Get ready for some "FMM" (Full Motion-Madden) in EA's latest sensation, *Madden NFL '97*.

■ **Online Journal, 10/23/96:** Call from *boot*. Would I be interested in reviewing football sims *as if they were war games*? That's the most insane assignment any editor's ever offered me.

"Just think about it. I'll call you back in an hour."

I *do* start thinking about it, and the more I do, the more parallels I see. Football as a metaphor for tactical combat is not so far-fetched. It combines movement, "firepower," a fluid set of "objectives." Like war, football can be "the province of chance," and the success or failure of one's tactics depends on the myriad outcomes of man-to-man actions. Each game is a discreet "battle," and the linked succession of battles forms a "campaign," i.e., a whole season.



***Touchdown*'s amateur graphics reflect a barren game.**

If the coach is a commanding general, the QB is the squad leader who implements the overall strategy by means of tactical decisions. Wide receivers are like cavalry or light armor, depending on speed and mobility; running backs and tight ends are the assault squads; linebackers are heavy support weapons—mortars with legs; safeties are the tactical reserves, the ones who plug "breakthroughs" in the defensive line... My God, it all begins to make sense!

■ **10/23/96 (one hour later):** *boot* calls back: "Thought about it?"

"Look, the only team I follow is the New York Giants, and this season they look like the Confederate Army two months away from Appomattox..."

"Exactly. Take command of the New York Giants and change the course of history."

"Send me the games."

What have I let myself in for?

■ **10/24/96:** A courier hands me a bulging box. I sign for the delivery. Inside are: *Total Control Football*, *Touchdown*, *NFL Quarterback Club '97*, and *Madden NFL '97*. Where to start? I pick *Touchdown* at random, which promises, on the box cover, "bone crushing action!"

One crucial difference between war games and football sims is the terrain-map. Football's is always the same. In *Touchdown*, as in many games, you can customize the map to a certain extent by choosing to play on natural grass or AstroTurf, or under rain or snow. The effects are subtle, but, when combined with the units'... er, players' stats, and mixed with the random effects of fumbles, sacks, and penalties, often profound in consequences.

Touchdown strikes me as the equivalent of such pretty, but cold and uninvolving, war games as *Frontlines* and *Iron Cross*: The animated "combat" is smoothly rendered, accompanied by plenty of grunts, groans, and referee whistles, but there is a down-to-down sameness about things; rarely do I get that knife-edged sense of the Decisive Moment that a great sim delivers.

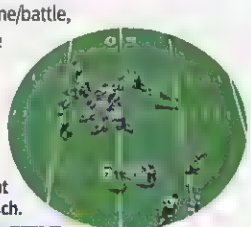
Although the box promises *Touchdown* is "great for football novices," the minimalist manual and lack of tutorial assume much—a novice coming cold to this game would be as hopelessly lost as a beer-and-pretzels *Risk* player trying to figure out Gary Grigsby's *Pacific War*.

No modem, network, or e-mail play is supported. In sum: *Touchdown* is a mediocre product that pales beside the competition.

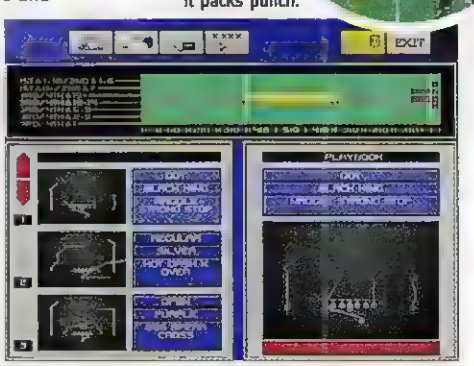
■ **10/25/96:** *Total Control Football* proves to be a gripping simulation of an NFL franchise. As Chief of Staff, you have absolute power (within the limits of the salary cap and the tolerance of the dreaded owners, who are analogous to the politicians who hire and fire Chiefs of Staff) to scout and recruit new players, and hire and fire subordinate commanders (offensive and defensive coaches, trainers, scouts, even a "medic"—the team's orthopedist!). And you must keep a close watch during training camp, to see who you'll be able to count on.

Fine-tune your force by closely examining the stats: win/loss records; expertise in various tactical skills; and the fine balance between ego, intelligence, physical strength, and discipline. Once you take the field, move to your command post (a luxurious and Olympian skybox with a God's-eye view of the gridiron) and the games commence. As Supreme Commander, you may, of course, overrule your coaches' game plans, but if you've done your job and picked good subordinates, you should trust them to do the right thing at the right time, leaving you free to enjoy the unfolding campaign. (If they don't, you can always fire their asses later...)

After the game/battle, you tend to the wounded (con-



***Total Control Football* may not have the fancy camera angles of its brethren, but it packs punch.**



Choose your formation and call a play based on your field position in *Total Control Football*.

Try it out! demo on the bootDisc

Play last year's Super Bowl on the demo of Madden NFL '97.

Nothing beats *Madden*'s sideline view of the struggle for gridiron supremacy.

sult the X-rays in the training room), bring in replacements for the seriously injured, and make roster ruts at the end of the preseason. This demands cold objectivity, since you must whittle your original 80 down to 45 men by the regular season. Battle scenes (gameplay views) are limited to four logical and useful angles: behind the QB, from the sidelines, behind the LB, and an oblique 3/4 view of the whole line of scrimmage—and that's all you really need. Who has time, during a complex 10-second play, to mess with a dozen fancy camera angles?

Ultra-sharp graphics, intuitive interface, excellent documentation, and a nice sense of cumulative seasonal sweep make this game a standout. It combines the best aspects of fantasy football and a great strategic-level war game, a la *High Command* or *Third Reich*. Best of all, *Total Control Football* gives you a megalomaniacal sense of utter dictatorial power! Highly recommended!

■ **10/26/96:** My wife passes my study door after I boot *Madden NFL '97*. Big John is pontificating in front of a chalkboard covered with X's and O's. At the sound of his voice, she makes a crucifix with her fingers and screams: "Back, back, thou fiend from hell!"

Madden aside, this game is an absolute bear to install. Not only are the hardware requirements steep (40MB of free hard drive space!), but it's unspeakably twitchy—first refusing to recognize my Sound Blaster, then my mouse driver! Several phone calls and much cursing later, the thing fires up and I am plunged into pure gridiron heaven.

If the previous game was the equivalent of a streamlined Chief-of-Staff strategic-level war game, *Madden '97* is one of the hardest-core, down-to-the-rivets games—*Panthers on the Prowl*, for instance—in which the outcome of firing a single round is factored on penetration stats based on projectile velocity (adjusted for wind-drag), size, mass, density, and metallurgical hardness versus the target's armor thickness, slope, and angle of the hit. You either revel in this level of detail, or your mind glazes over; there ain't no middle ground.

Madden '97 is aimed at fanatics who have mastered previous games in the series; casual fun-seekers need not apply. The former, though, won't be disappointed. It's all here: dramatic high-res motion-capture graphics that rival the best TV camera work; full-season managerial and coaching controls; all the tactical options your brain can hold (including 500 from Big John's own playbook); even a "Madden University," which is like the West Point of football (but without the hazing and dress code!).

As the QB in *NFL Quarterback Club '97*, you'll want to choose your plays carefully.

Like the best historical war games, *Madden '97* lets you replay great contests from the past and try to change history: More than 100 NFL teams are on the roster (including "secret teams" you'll have fun discovering), as are all the Super Bowls that ever wuz, and customizable fantasy teams.

Yes, the price of admission is high, but if you're grognard enough to handle the complexities, you'll find hundreds of hours of entertainment here. My only quibble: Game scores tend to be unrealistically high. Game after game ended "73-58," "48-42" and the like... more like a bad basketball game than a good football game.

■ **10/27/96:** Fighting off fatigue, I install Acclaim's *NFL Quarterback Club '97*. I am reminded of *Close Combat*: You're in tactical command, you call the plays, and hope your troops will respond to the pressures and vagaries of combat in such a way as to sustain your advance or make your defenses impregnable. You also hit the beach head, up close and personal (which you can't do in *CC* and most other real-time war games), putting yourself in the pocket and trying to hurl the long bomb into the hands of your favorite receiver.

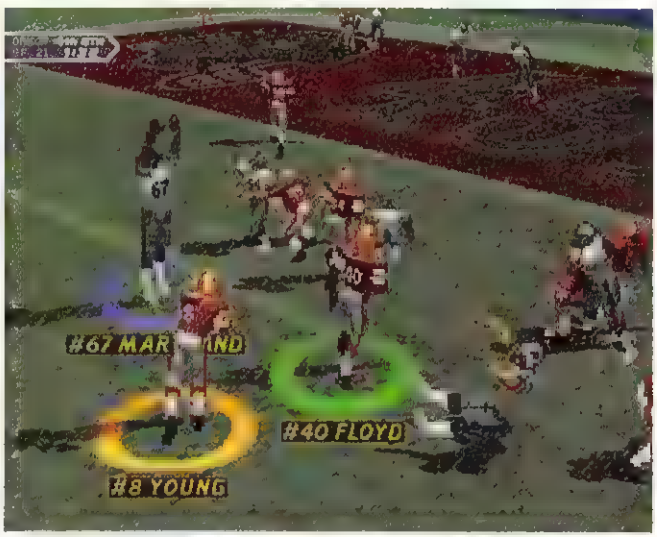
There's intense visual action and superb sound effects (was that a snapping ankle bone I just heard?); all the camera angles you could ask for; and plenty of classic historical clashes to recreate; plus some fascinating what-if scenarios, such as a Jaguars/Panthers brawl in Super Bowl XXXIV.

Altogether a rousing simulation, *if* quarterbacking is your fetish.

■ **10/28/96:** Story is done and uploaded to *boot*. Thinking about that Giants-49ers game around Thanksgiving, back in 1975. Third down Giants, bottom of the fourth. They ran a single-back slot-reverse and got stomped; after analyzing the stats carefully, I decided to try for a quick-slant shotgun and...

I play a few rounds of *Panzer General* to clear my head.

— William R. Trotter



Snow? In San Francisco? Weather plays a major factor in *NFL Quarterback Club '97*.

boot verdict

PRODUCT: Touchdown
PRICE: $39.99
COMPANY: Intermark
PHONE: 714.833.1220
URL: www.intermk.com

5

boot verdict

PRODUCT: Total Control Football
PRICE: $54.99
COMPANY: Philips Media
PHONE: 310.444.6600
URL: www.philipsmedia.com

8

boot verdict

PRODUCT: Madden NFL '97
PRICE: $59.99
COMPANY: Electronic Arts
PHONE: 800.245.4525
URL: www.easports.com

8

boot verdict

PRODUCT: NFL Quarterback Club '97
PRICE: $ 49.99
COMPANY: Acclaim
PHONE: 516.656.5000
URL: www.acclaimnation.com

7

H/W

Microsoft Intellimouse

Another use for your middle finger

Microsoft's new mouse mounts a wheel/button combo between the left and right buttons. But the company shouldn't expect the world to beat a path to its door, because very little software takes advantage of the rodent's new appendage. Currently, that very short list consists of Win95's Help and Explorer utilities; *Internet Explorer* and *Works*; and a few utilities in NT 4.0 (*Notepad*, *Wordpad*, Explorer, and Help). Microsoft promises that *Office 97* will also exploit the device.

But the third button doesn't function at all in DOS, Windows 3.1, or OS/2. And forget using the wheel/button for mouse-looks in *Quake*, because it doesn't work as a normal third button.

So what's it good for? You can scroll through windows without touching the scroll bar, shrink and enlarge documents on the fly, and navigate web pages and menu trees without using icons.

The Intellimouse's wheel/button is like an appendix: it doesn't do any harm, but it's not good for much either.

— *A.S.*

boot verdict

PRICE: $84.99
COMPANY: Microsoft
PHONE: 800.426.9490
URL: www.microsoft.com

S/W

SCSIVision

Laugh, cry, hurl...

Some discs are so bizarre, they boggle the mind. *SCSIVision* bundles SCSI-related educational material, benchmarking tools, a virus checker, some disk utilities, a game, and some amazingly cheesy video and sound clips. While the disc sorely lacks value and quality components, it *did* have all of us on the floor laughing at its badness.

Highlights include a SCSI utility that refuses to detect any devices unless you have a BusLogic SCSI controller, *GEAR* CD-R premastering software, *CodeBlue2* crash recovery tools, Microsoft's *Internet Explorer 3.0* browser, and the *All About SCSI* tutorial program. And then there's the filler that makes "*SCSIVision* a fun SCSI tool."

Devil's Eye is a weak 3D dungeon game that boasts, "unlike other games, monsters DO pass through walls." But for real laughs watch the bundled AVI clips—the man throwing his PC off a balcony gave us some ideas about what to do with *SCSIVision*.

— *C.D.*

boot verdict

PRICE: $99 (bundled with BusLogic SCSI adapters)
COMPANY: Mylex
PHONE: 510.796.6100
URL: www.mylex.com

Gene Wars

Wanna play with DNA?

Try it out! demo on the bootDisc

Gene Wars' mutant bestiary is the perfect showcase for Bullfrog's new Skeletal Mapping game engine, but this god-game's goofy sci-fi sound effects and comic visuals detract from an otherwise engaging adventure.

In your struggle with three other alien races for control of a planet, you must bioengineer your own organic weapons. If you've ever wondered what would happen if you spliced mule DNA into crab DNA, here's your chance to find out.

The game's crisp SVGA graphics are among the best ever, and the 2D sprite-rendering engine delivers smooth animation over the three-quarter overhead view. A simple point-and-click interface gets you into the thick of the action, and four-player action is available over an IPX network (no modem or serial-port play).

Gene Wars is good, but would be better without the silliness. — *A.S.*

boot verdict

PRICE: $34.95
COMPANY: EA/Bullfrog
PHONE: 800.245.4525
URL: www.bullfrog.co.uk/

Presto! PageManager Suite

Makes scanning more complicated

Billed as a "Scanning Operating System," *Presto! PageManager* makes you ask, "Why?"

Presto sets out to "shield users from compatibility problems between the application and scanner," which it does. But this is the sort of thing that takes all of 10 seconds.

Next, the software allows scanning directly into applications, which it doesn't even really do. Hitting the Scan button on the background app's floating toolbar launches your scanner, depositing the image into an In-Box, to then be routed (by you) to one of the waiting programs you've placed in the Application Bar at the bottom of the screen where drag-and-drop technology then launches the app. Sound easier?

The suite contains six other "equally helpful" apps for scanning in forms and business card info, cataloguing images, and sending color faxes (assuming a color fax machine awaits on the other end of the line). A meager image editing program and surprisingly robust OCR app join the SE version of Kai's *PowerGoo* in rounding out the bundle. — *B.D.*

boot verdict

PRICE: $149
COMPANY: NewSoft
PHONE: 800.436 4365
URL: www.tophat.com

H/W

boot KICK-ASS! PRODUCT

GrabIT vs. Snappy 2.0

A showdown of the video frame grabbers

Though these two little boxes have a lot in common, Snappy delivers great performance and is the clear winner in this beauty contest.

GrabIT and Snappy 2.0 have a lot in common. Both hook up to your parallel port and, with the click of a button, both grab a single frame from an NTSC video source. They're incredibly easy to use and both come bundled with a collection of nifty image manipulation tools. But that's where the similarities end.

On the surface, GrabIT looks like a better package, with both S-video *and* composite input, while Snappy only has composite. GrabIT's short parallel port extender cable allows the Walkman-sized device to come forward, so it is more accessible and allows your PC to sit near a wall; Snappy requires five or more inches of clearance behind your machine.

But then the tides shift.

GrabIT draws power from either a PS/2 or DIN keyboard port; Snappy gets 1,000 grabs out of a 9-volt battery. (The battery is better because it avoids tangled cables.)

GrabIT displays a continuously-updating color preview of the last six frames grabbed, with a new frame automatically grabbed about every two seconds. (Color adjustments must be performed in a separate window.) Snatch any window you want and save it in either 720x480 or 360x240 resolution, with up to 24-bit color, then save your work as BMP, JPEG, PCX, TARGA, or TIFF formats.

Surprisingly, GrabIT won't allow you to view your captured images at full size. The only way to make sure you got the grab you wanted is to open the file with a stand-alone paint program. And as if that wasn't enough, the GrabIT window can't be minimized. The final insult: While GrabIT is running, your entire system slows to a crawl.

By comparison, Play's new Snappy 2.0 software is simple elegance. The small preview window is in glorious black and white, but it's updated twice every second. Digitized images can be viewed full-size, and then cropped and color-adjusted on the fly from within the capture software. Snappy captures in 24-bit color up to 1500x1125 resolution and has an ultra high-res mode that performs multiple upsamples on a still frame for maximum quality. But even when digitizing from a live video source, Snappy's quality was leaps and bounds ahead of GrabIT.

Snappy supports BMP, JPEG, PCX, TARGA, TIFF, and the new PNG file format. (PNG has all the cross-platform advantages of GIF, but with 24-bit color depth.) Snappy can also digitize images from directly within any TWAIN-compliant program (such as *Photoshop*).

GrabIT does a tolerable job—and its six-pane interface is cool—but many of its images are poor and grainy. Snappy delivers across the board, with the best quality images and a polished user interface. It costs a little more, but Snappy delivers much better performance. Plus, it's bundled with Adobe's *PhotoDeluxe*, Gryphon's *Morph*, and MetaTools' *Kai's PowerGoo SE*. GrabIT only comes bundled with *PhotoMorph II*. GrabIT is capable, but Snappy is the clear winner in this competition.

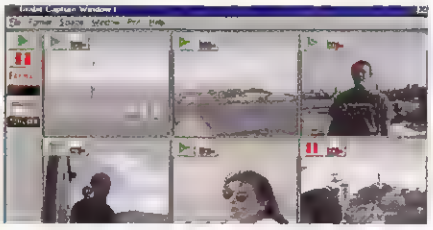
— Chris Dunphy

Read the Fine Print

When you see both of these products on the shelf and start comparing the packaging, beware. Both boxes tout an admirable list of magazine awards and editors picks; the only difference is Snappy earned its awards. GrabIT has plastered the back of their box with awards, such as "PC Magazine: Best of Year"—but only on a very close second look do you realize that none of the awards apply to GrabIT. Instead, these accolades were won by the bundled *PhotoMorph II* software, way back in 1994.

Though it does an admirable job, zooming in reveals the GrabIT's deficiencies.

Snappy's 1500x1125 image holds up even when zoomed in. It's amazing this came from an NTSC camera!



The six-pane main window is nice to use, but the absence of a Minimize button keeps it in your face.

Snappy's user interface is polished and easy to use.

boot verdict

PRODUCT: GrabIT
PRICE: $159.99
COMPANY: AIMS Lab
PHONE: 510.661.2525
URL: www.aimslab.com

5

boot verdict

PRODUCT: Snappy
PRICE: $199.95
COMPANY: Play
PHONE: 800.306.7529
URL: www.play.com

9

H/W

Toshiba 12x CD-ROM Drives

The law of diminishing returns

Even though 8x CD-ROM drives have only been on the market for a few short months, a generation of 12x drives is here to push them off the stage. Toshiba's XM-5701B (SCSI) and XM-5702B (IDE-ATAPI) are the first drives on the scene.

The specs promised by Toshiba are enough to instill lusty thoughts in the most chaste PC owner: Sustained data-transfer rate of 1,800K/sec, average access time of 125ms, and compatibility with all the usual standards.

But before you drop one of these babies into an empty drive bay, consider this: The actual performance you'll realize depends as much on your computer's specs as it does on the drives themselves—especially with the IDE-ATAPI model.

We installed both drives (one at a time, of course) in our 166MHz Pentium test system and evaluated performance with a variety of tasks. We clocked an average access time of 127ms for the ATAPI model and 128ms for the SCSI version—very close to Toshiba's claimed performance of 125ms. But the ATAPI drive fell short of the 1,800K transfer rate promised, delivering an average data-transfer rate of only 1,030K/sec. That's much better than 8x drives (which peter out at less than 800K/sec); but that performance consumed a whopping 81 percent of the CPU's clock cycles!

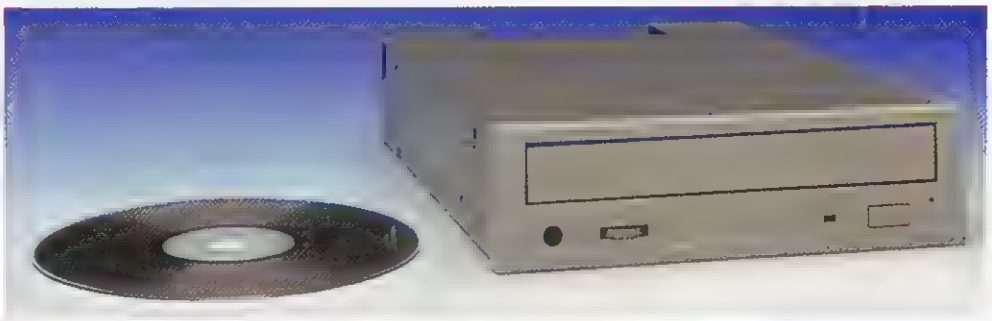
Paired with an Adaptec 2940-UW SCSI host adapter, Toshiba's XM-5701B SCSI 12x drive delivered much better performance—at least in terms of CPU utilization. It achieved the same average data transfer rate (1,030K/sec) as its ATAPI cousin, but it consumed just 44 percent of the CPU's clock cycles.

The ATAPI drive's outrageous CPU utilization can be attributed to our test machine's implementation of IDE bus mastering and its installation of Win95 OSR-1 (OEM Sales Release 1) as much as it can be attributed to the drive's interface. Toshiba claims you'll experience much better performance with a newer motherboard and Win95 OSR-2 (see sidebar).

Both drives performed well in our real-world tests. Loading a mission in *Wing Commander IV*, took 7.4 seconds on the ATAPI model; 7.9 seconds on the SCSI version. But when we tested how long the drives would require to transfer a 579MB file from the disc to the hard drive, the SCSI model came out slightly ahead with a performance of 5 minutes, 35 seconds, compared to 5 minutes, 41 seconds for the ATAPI.

If you're upgrading an older machine, you should seriously consider going with the SCSI version of Toshiba's 12x drive—especially if you already have a SCSI interface in your machine.

— Andrew Sanchez



Thinking of buying an 8x? Think again! These 12x babies wanna rock your world. But do manufacturer's specs live up to the hype?

boot verdict

PRODUCT: XM-5702B (IDE-ATAPI)
PRICE: $165
COMPANY: Toshiba
PHONE: 714.457.0777
URL: www.toshiba.com

boot verdict

PRODUCT: XM-5701B (SCSI)
PRICE: $195
COMPANY: Toshiba
PHONE: 714.457.0777
URL: www.toshiba.com

Beyond the 12x Frontier

Toshiba's speedy 12x CD-ROM drives are the first to hit the boot-Lab, but others have arrived already, yearning for their time in the spotlight. With yesterday's 8x and 10x CD-ROM drives becoming road-kill, slowly decomposing on the CD-ROM autobahn, drive manufacturers are ready to appeal to your need for more and more speed.

By the time you read this, **TEAC** will be shipping its CD-512E 12x EIDE unit, and **Mitsumi** will have its FX 12x EIDE model on your favorite distributor's shelf. (Look for hands-on reviews of both these models in an upcoming issue of *boot*.) Expect other manufacturers to quickly follow suit, although no other announcements have been made.

And don't think for a New York minute that 12x is the final frontier. Engineers have already designed the 16x successor to the 12x drive.

Speed limits? We don't need no stinkin' speed limits!

Damn the DMA—Full Speed Ahead!

The XM-5702B's high CPU utilization in our testing can be attributed to a number of factors, but most significantly, the Enhanced IDE controller and the version of Win95 installed on our test system.

In a perfect world, your EIDE controller and the drive would both support bus-mastered DMA transfers. In this scenario, the controller transfers data directly from the drive to the PC's memory in a single bus cycle, reducing traffic on the system bus. If the controller doesn't support bus mastering, data must be transferred in two steps, with the host's DMA controller reading the data on one clock cycle and writing it to system memory on a second cycle. Accommodating the data-transfer rate of a 12x drive without bus mastering dumps a helluva load on the CPU.

So if your EIDE controller and your CD-ROM drive support bus mastering, you're all set, right? Wrong, because the current version of Win95 (OSR-1) doesn't support EIDE bus-mastering devices. *Yoink!* Updating your motherboard's BIOS and installing the latest Win95 device drivers for your motherboard's EIDE controller may help. Microsoft plans to implement such support in Win95 OSR-2, but this upgrade won't be available directly to consumers until late this year as part of the next incarnation of Win95, even though it *will* be installed in new systems. *Double Yoink!* The only way you'll be able to get OSR-2 will be to (a) buy a new system, or (b) pirate it from someone else who bought a new system (insert standard anti-piracy tirade here).

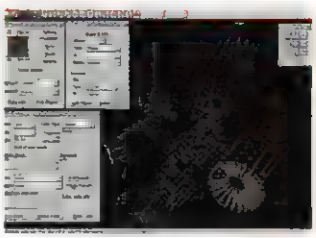
S/W

www.bootnet.com

Check out the library of Descent levels on our web site

Descent Mission Builder

And on the seventh day...



Crazy-insane levels are but a mouse click and keystroke away...

Creating new worlds is no easy task. Ask God. But *Descent Mission Builder* endows you with the ability to create new worlds for one of the all-time great games: *Descent* (but not *Descent II*). Problem is, you'll also need god-like powers of concentration to learn this software, since there's no tutorial and no printed manual.

Descent Mission Builder doesn't approach 3D design like conventional editors and 3D modelers. Instead of treating rooms as polygonal objects that can be manipulated within a 3D workspace, *Mission Builder* treats *Descent* rooms like one, long, continuously linked cubic segment (viewable in wireframe or flat shaded). Each new segment sprouts from the previous segment's active side. Intricate designs, such as curved tunnels, are handled by *Mission Builder*'s spline-based Curve Generator (see sidebar).

The point-and-click GUI belies the power lurking below—almost everything within *Descent* becomes a pawn which you can control. From the placement of in-game entities (enemies or otherwise), strict control over interior corridor texture mapping, to ambient light adjustment, *Descent Mission Builder* offers almost every option you could want. Master level designers can tweak their creations with hidden trigger placements, wall strength, traps and enemy ambush points, false walls, and more.

But *Descent Mission Builder* is far from flawless. A good editor has an Undo/Redo function—this one doesn't. The Edit toolbar (used to adjust a cube's size, beveling, and angle) is hidden behind the scenes—it should be readily accessible on the desktop. The Materials Editor displays only one texture at a time from the multitude that are available. Give me more, I say! How 'bout a real-time preview option? And why must I constantly hit F5 to bring out the Edit toolbar, then move my windows into position? The program should let me create custom tool layouts. Hey, I'm paying 20 bucks for this software.

Once you've created your dream level, the editor will pretest it to ensure that certain criteria are met: Every level must have a reactor, a starting point, and an exit, for example. The test will also ensure that you don't exceed the maximum number of rooms that *Descent* can handle. Copy the new RDL (single-level mission), HOG (multilevel mission), and MSN files to your *Descent* subdirectory and you're ready to fly.

Descent Mission Builder is cool because it delivers absolute control over every aspect of *Descent*'s twisting, turning, subterranean realm. It would be great if it weren't so awkward.

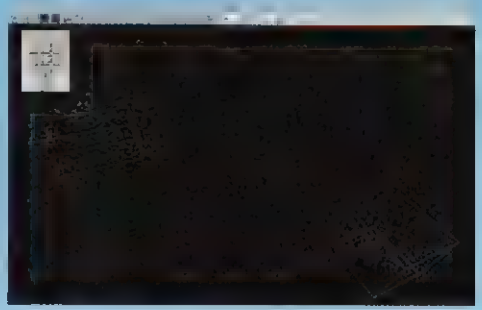
— Andrew Sanchez

boot verdict

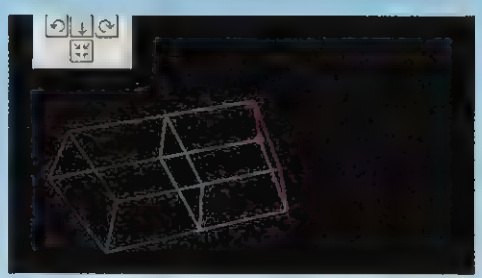
PRICE: $19.95
COMPANY: Interplay
PHONE: 800.454 6064
URL: www.interplay.com

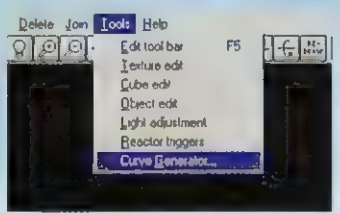
Roll up a phat curving corridor!

① Select the first active cube by left-clicking on it with your mouse, then use the left or right arrow key to select the active side (shown here in red).

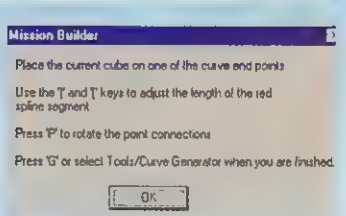


② Press the spacebar and your first active side will be designated by its dark green trim. Left-click on the cube you want the curved path applied to. Designate which side will be the connection by making it the active side (using the left or right arrow key).

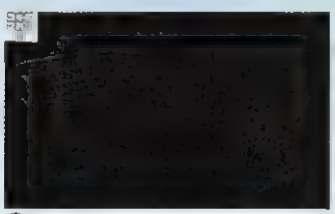




③ Go to the Tools menu and select Curves Generator (or just type 'G') to enter the next phase of curved corridor building.


Mission Builder
Place the current cube on one of the curve end points
Use the 'I' and 'I' keys to adjust the length of the red spline segment
Press 'P' to rotate the point connections
Press 'G' or select Tools/Curve Generator when you are finished.
OK

④ This is your friend, since there is no printed manual. Commit this to memory, then click the OK button.



⑤ A distorted tunnel. Looks like mixed-up point alignment. Press "P" to move the second active sides' point alignment to match up with your first active cube side.

⑥ Ahhh... much better. Doesn't that look precious! Note the smooth gradual curve—no awkward twists here!

⑦ Don't be afraid to play with the degree of curve in your corridor. Fiddle with the "[" and "]" keys to adjust the length of your spline segment. When you're satisfied, press "G," click on the OK button, and your corridor is ready.

H/W

Verbal Commander

Spray it, don't say it

File Verbal Commander under the heading: "Seemed like a good idea at the time."

Star Trek captains might look cool barking commands at the computer, but when you're sitting in front of your PC wearing a headset mic and yelling "Jump" or "Fire" again and again, you just feel like an idiot.

Worse yet, Verbal Commander makes you feel like an idiot who can't finish the easiest level. Verbal Commander is *supposed* to endow all your games (DOS and Win95) with speech-recognition capabilities—so you can yell commands instead of banging a keyboard. But during several hours of *Quake* and *Dark Forces*, Verbal Commander misunderstood my commands and produced either the wrong action or no action at all some 20 percent of the time.

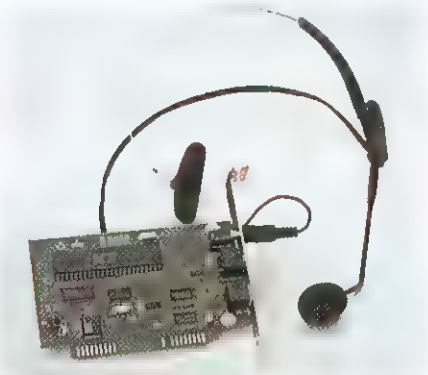
Verbal Commander consists of a half-length ISA card, a noise-canceling headset mic, and voice-recognition software. Installation is painless: just plug in the card, connect your keyboard to a pass-through connector, and attach the mic. You'll be up and shouting in minutes.

First train Verbal Commander to recognize your voice (and train yourself to speak consistently with the same tone and volume) by repeating a game command. This training doesn't take long—less than five minutes for *Quake* commands such as Fire, Up, Jump, Thunderbolt, and Axe. You can assign up to 20 verbal commands to each game.

The system works with virtually any game, but comes with custom control settings for 25 titles, including *Quake*, *EF2000*, and *U.S. Navy Fighters*.

Verbal Commander is a fun toy, even if it doesn't always work. Just be careful where you use it. Screaming "Fire!" and "Jump!" within the confines of a 10th-floor office tower isn't a good idea.

— *Bryan Del Rizzo*



The Verbal Commander doesn't always recognize your commands. It's best used for changing weapons, so you don't have to take your hands off the fire and navigation keys.

boot verdict

PRICE: $149.95
COMPANY: K2 Interactive
PHONE: 888.752.9524
URL: www.k2i.com

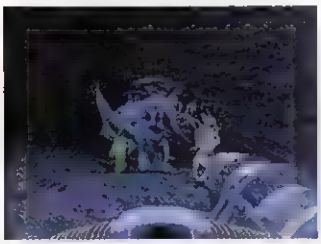
S/W

Duke Nukem 3D: Plutonium Pak

Guess who's back and on the attack

Put the 'nuke' back into *Duke Nukem 3D* with an all-new bad-ass expansion pack that cooks more gooey aliens than a pissed-off Sigourney Weaver having a bad hair day.

By patching the current retail version of *Duke 3D* from v1.03 to the v1.04 *Atomic Edition*, the *Plutonium Pak* offers much more than just a boatload of new one-liners—it takes you into 11 new bad-busting missions ("The Birth"); and packs more xenophobic invaders than you can shake a shotgun at, including two new alien troopers (one of which can shrink you). All of this culminates in the underwater trashfest with the horrific Queen and her monstrous brood.



The horrific Queen spawns more of her alien brood—nail her before she nails you!

The microwave gun (a new weapon, toggled with the shrink ray) grants you the power to literally 'nuke' your quarry. Hold down the trigger and watch them slowly expand before exploding in a bloody mush. Any poor sloth stupid enough to get caught in the ensuing rearranging of entrails *will* take damage—perfect for those close encounters.

Level design, per 3D Realms' standards, is outstanding and littered with pop-culture references, from the opening level (a serious spoof on *Mission: Impossible*, complete with an almost impossible laser trip-bomb trap), to their perverse ideas about how hamburgers in an alien infested Los Angeles are made (explore Duke's own hamburger joint), to barging in on an S&M movie set—the fun factor and hypersexual titillation never wane.

Anyone up for a little menage-a-Duke? The new pak maintains the raunch.

But there's one drawback: Whereas classic *Duke 3D* never required that the original disc be in your PC, the *Atomic Edition* won't fly without it. A smart player (with disk space to burn) should update a copy of v1.03.

Add to that, new cinematic cutscenes, and a smorgasbord of screen savers and Win95 Desktop Themes, and you have the perfect fix for your *Duke Nukem* itch.

He's back, he's pissed, and he's ready to rock. Get ready to tear those aliens a new orifice with *Plutonium Pak*—you won't be disappointed.

— *Andrew Sanchez*

Atomic vs. Plutonium

There has been quite the confusion about which *Duke* package is right for you. Lets get this straight. *Duke Nukem 3D: The Plutonium Pak* consists of the patch disk (upgrading v1.03 to v1.04 *Atomic*); the new missions; and Windows stuff; and is intended solely for current owners of the *Duke Nukem 3D* v1.03 retail edition. The *Duke Nukem 3D Atomic Edition* includes *everything*: *Duke 3D* v1.03 retail plus everything included in the *Plutonium Pak* (for you young bucks fresh to the *Duke Nukem 3D* game).

Got It? Good!

boot verdict

PRICE: $29.95
COMPANY: GT Interactive
PHONE: 800.305.3390
URL: www.gtinteractive.com

H/W

www.bootnet.com

See sample scans on our web site

Nikon ScanTouch AX-110

Quality that extends beyond the specs

The ScanTouch AX-110 is a speedy flatbed scanner that produces the tack-sharp images you'd expect from optics sporting the Nikon moniker.

On a full A4 page, the AX-110 spits out 8-bit depth at 300x600dpi of optical resolution for each of the RGB channels in roughly 30 seconds. The TWAIN-compliant app you're acquiring into, on the other hand, might require a full minute or more to bring up the final image for editing. Software interpolation slows matters down considerably, but allows you to acquire images with resolutions up to 4800x4800dpi. Don't wet yourself yet. These are interpolated resolutions. Under the best of conditions, they're only fractionally sharper than up-sampling with *Photoshop*'s built-in interpolation algorithms.

SCSI-II transfer rates of up to 10MB per second are just as speedy as the single-pass acquire times, and the AX-110 has two connectors to choose from: 25-pin or 50-pin.

The excellent *Nikon Scan* software is one of the AX-110's best features.

Most of the AX-110's features are fairly nondescript in the field of flatbeds, except the excellent *Nikon Scan* acquire software. This prescan utility allows you to specify media types (line art, grayscale, or color; reflective art or transparencies using the optional Transparency Adapter); image size, cropping, and resolution; and elaborate color correction controls. Beyond brightness, contrast, black-point and white-point settings the *Nikon Scan* software provides a Gamma Curve window that allows for complete manipulation of each RGB channel. Applying these powerful tools to a preview scan that takes less than 10 seconds to acquire will save you mucho time later, when you're tweaking some 40MB file.

While not in the same class (and price range) as its big brother, the AX-210, the AX-110 has little to distinguish itself from the competition except speed, sharpness, and excellent software. But, then again, isn't that enough?

— Brad Dosland

Use either the 25-pin or 50-pin SCSI-II connector for 10MB per second transfer rates.

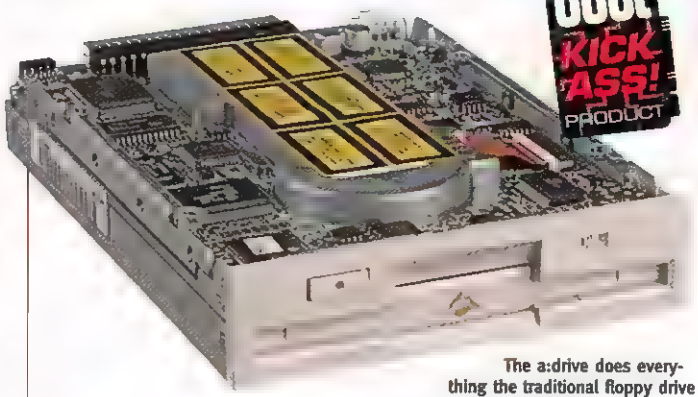
The AX-110 requires a significant chunk of desktop real estate, as flatbed scanners are wont to do.

boot verdict

PRICE: $695
COMPANY: Nikon

PHONE: 800.526.4566
URL: www.kit.co.jp/Nikon/EID/

8



The a:drive does everything the traditional floppy drive does—only better.

a:drive

Ditch the disk and make the switch

While many are nominating the Zip or Jaz cartridge drive as the successor to the floppy drive, they really aren't designed for that job. The a:drive, on the other hand, is.

The LS-120 media holds 120MB.

With qualifications such as five times the speed boost of a floppy drive, more than 80 times the capacity of a lowly 1.44MB diskette, and backward compatibility with its inferior cousin; the a:drive is a serious contender.

From the outside, the a:drive looks like a traditional floppy disk drive. It slides into the same 3.5-inch expansion bay, and reads and writes 1.44MB and 720K diskettes. It even uses the same mechanism as a floppy disk drive, but can read and write LS-120 media (something its floppy kin cannot). The 120MB cartridges have identical dimensions to a traditional diskette and can be used with any LS-120 drive.

We installed the a:drive in our benchmark Pentium 166MHz, and it was recognized immediately in Win95. If you plan to use both a traditional floppy disk drive *and* the a:drive you'll need an additional floppy DC power connector, since most PCs only have one.

The a:drive delivered exceptional performance. Formatting a disk on a regular floppy drive took almost 2 minutes, while the a:drive completed the task in *only* 15 seconds. Copying a 1MB file took exactly 1 minute on a regular floppy, but the a:drive needed only 9 seconds. Damn impressive.

With its speedy performance, ability to serve as a booting device, and backward compatibility, there's really no reason the a:drive shouldn't be integrated into every desktop and notebook computer worldwide.

— Bryan Del Rizzo

How Does It Work?

To achieve compatibility with both old and new media, the a:drive utilizes dual gap heads—the wide head and linear encoder are used to read and write low-density data, while the narrow head and optical servo are used to read and write high-density data. The a:drive also uses error correction code, and can identify and correct for imperfections in the data or from disk wear.

boot verdict

PRICE: $210; 120MB cartridges $15 (.13¢/MB)
COMPANY: O.R. Technology

PHONE: 408.866.3000
URL: www.ortechnology.com

9

S/W

You Don't Know Jack 2

Sue won't show cat poo

If you're mystified by that gibberish, well, you just don't know jack.

If you couldn't get enough of the original *You Don't Know Jack* trivia game and the subsequent expansion pack, you'll be ecstatic to learn that *YDKJ Volume 2* is here. With more than 800 zany new questions, this new stand-alone game is the same as the original: hilarious.

Take a television quiz show; add irreverent, pop-culture trivia questions; and slowly fold in a little racy humor. Mix well, and prepare to be entertained. Serves players 18 and over for 20 hours or more.

Volume 2 adds new features such as celebrity guest appearances, new types of questions (including fill-in-the-blank), new voice talent, and a high-score list (finally!).

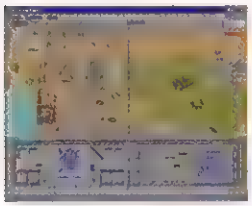
Trivia hasn't been this much fun since, well, the original *You Don't Know Jack*. — *B.D.R.*

boot verdict

PRICE: $29.95
COMPANY: Berkeley Systems
PHONE: 800.344.5541
URL: www.berksys.com

Return Fire

Don't play this alone



Try it out! demo on the bootDisc

Capture the flag isn't much fun to play by yourself, and neither is this take on that classic concept featuring tanks, assault vehicles, helicopters, and jeeps. But hook up a friend for head-to-head play on the split-screen and *Return Fire* is a blast.

The thundering classical music score really enhances the game—"Ride of the Valkyries" plays as you zoom around in a helicopter; "The Hallelujah Chorus" as you find the flag, etc. Unfortunately, *Return Fire* lacks the depth that keeps you coming back for more. There are only a few varieties of enemies, and the challenge becomes repetitive fast. There is also no network play (big mistake). But for some fast, furious, friend-blasting fun, this is a great way to kill a few hours.

— *C.D.*

boot verdict

PRICE: $39
COMPANY: GT Interactive
PHONE: 800.610.4847
URL: www.gtinteractive.com

Wing Commander: The Kilrathi Saga

Terran-Kilrathi Relations 101

Try it out! demo on the bootDisc

Neuter those pesky intergalactic cats one more time with *Wing Commander: The Kilrathi Saga.*

This is no *Wing Commander 5-foot 10-pack.* Origin has tweaked and optimized the first three games in this series and made them even better. Running on Win95, they take advantage of DirectX (but not Direct3D); sport a new, digital, Dolby Surround soundtrack; and a frame-rate limiter that allows you to play these classics on a high-end Pentium (a user-adjustable frame-rate limiter would've been appreciated).

Among the five-disc set's highlights: *Wing III* now features interlaced video playback, delivering smoother cinematics and fewer stray visual artifacts. Origin also includes a patch for *Wing IV*, so you can play it under Win95. And finally, Win95-optimized versions of *Secret Missions I* and *II* are available free from Origin's web site. (You can also find them on this month's *bootDisc.*)

There's no new material here, but if you want to relive the destruction of K'tithrak Mang, *The Kilrathi Saga* offers sweet memories.

— *A.S.*

boot verdict

PRICE: $39.99
COMPANY: EA/Origin
PHONE: 800.245.4525
URL: www.ea.com/origin

H/W

CH Gamepad

Hands off!

CH's new *analog* Gamepad isn't worthy of the CH name.

Sure, analog controllers were fine five years ago, but state-of-the-art digital pads deliver more precision and firepower. The CH Gamepad's lack of programmability and weak multiplayer support are also major setdowns. And connecting two pads via a joystick Y-cable limits each pad to only two buttons.

Ergonomically, the CH Gamepad isn't bad. Its contoured underbelly fits comfortably in your hands and the buttons have good action; but the directional pad is an abomination. It's not properly centered (the raised edges need to be rotated about three degrees), so even simple movements aren't intuitive, and forget precise diagonals—they're just about impossible.

No matter what other bells and whistles you may add, a good gamepad should be programmable, digital, and support multiple players. The CH Gamepad fails on all three counts.

— *B.D.R.*

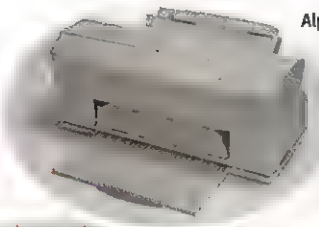
boot verdict

PRICE: $29.95
COMPANY: CH Products
PHONE: 800.624.5804
URL: www.chproducts.com

H/W

Alps MD-4000 Color Printer/Scanner

Attack of the two-headed monster

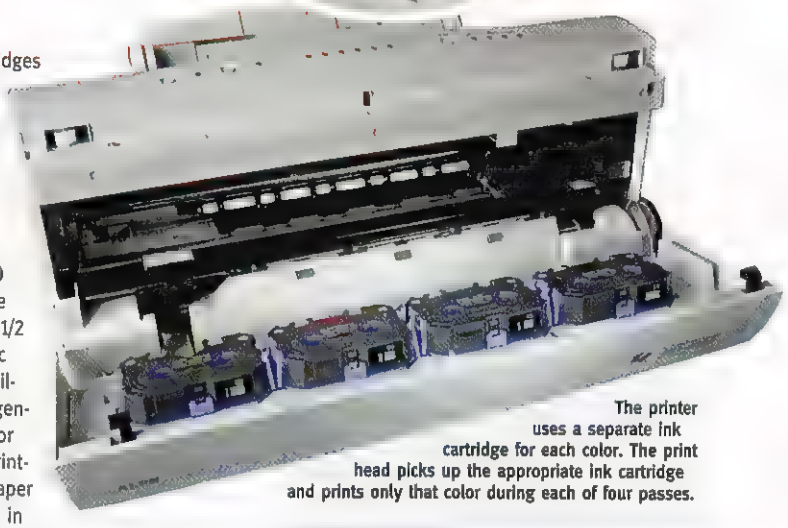


Alps' MD-4000 is an excellent color printer *and* color scanner. The printer uses a new dry ink that won't smear, even when exposed to moisture.

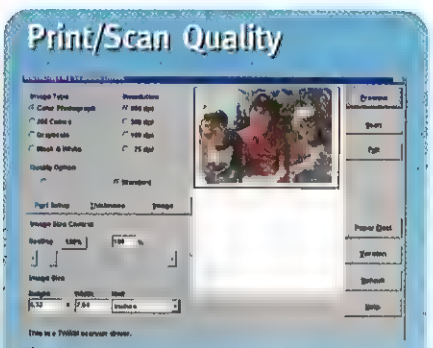
To earn a place in *my* home office, you must be versatile. Office, say hello to the MD-4000. This hybrid peripheral prints *and* scans.

The MD-4000's printer spits out colors at 600x600dpi (and 1200x600 in black and white), while the 24-bit TWAIN-compliant single-pass scanner delivers optical resolution up to 600dpi. (Alps' $499 MD-2010 uses the same print head sans scanner.) Print quality is excellent, especially with photographs. Text printing is awesome, producing perfectly legible type, even down to four points. Solid-color backgrounds, such as *PowerPoint* slides, show some banding though.

Unlike inkjet printers, the MD-4000's dry ink resists moisture and smearing. Ink comes in $6.60 ribbon cartridges (one each for cyan, magenta, yellow, and black), which produce an estimated 200 color prints. Black cartridges should last for 560 pages. The average cost per page is 3 1/2 cents. Cool metallic color inks—gold, silver, cyan, and magenta—are available for $8.99 each. The printer handles plain paper and transparencies in its 100-sheet auto feeder, and takes iron-on transfers, greeting-card stock, and backprint film in single-sheet mode. Color-matching options allow you to manually adjust the printer's color balance (saturation, red, green, and blue levels), or pick from presets for business graphics, photographs, or graphic art.



The printer uses a separate ink cartridge for each color. The print head picks up the appropriate ink cartridge and prints only that color during each of four passes.



The Alps MD-4000's scanner interface offers a host of options, including cropping.

This image was scanned on the MD-4000, saved as a TIFF file, and reproduced directly.

The same image, printed on the MD-4000, then photographed for reproduction in the magazine.

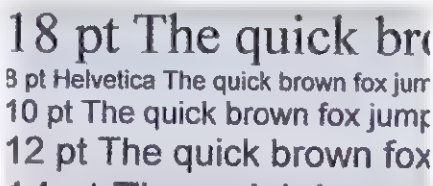
The quality of the MD-4000's scanner is just as good as its printer, but isn't nearly as convenient as a flatbed scanner. You must remove all the paper from the device and adjust the feeder before scanning. Documents must be inserted into a special holder, so a sheet feeder can pull the page across an optical pickup. Still, none of this presents too much of a burden. Alps' *CopyStudio* software allows you to preview, crop, and make other adjustments before committing to a scan.

The MD-4000 also does overtime as a color copier. The scanner copies the image to your hard drive, prompts you to reload paper, prints the image, then automatically deletes the file when it's finished.

If you need speed, steer clear of the MD-4000. Graphics require four passes across the print head: one for each primary color. Tino produce its exceptionally crisp black text, the printer first lays down cyan ink, then black. Printing a text-only page takes up to five minutes; large images can consume 15 minutes or more. While the scanner accomplishes its magic with just one pass, it's no speed demon either. Scanning in a 3x5-inch snapshot took more than five minutes.

Still, there's no denying the powerful allure of the MD-4000's outstanding quality.

— *Michael Brown*


18 pt The quick br
8 pt Helvetica The quick brown fox jum
10 pt The quick brown fox jump
12 pt The quick brown fox
14 pt The quick brown
10 pt brush script The quick brown fox jum
12 pt The quick brown fox jumped o

The MD-4000 produces incredibly sharp, black text. It's no speed demon, though.

This image was scanned from a 35mm slide. Resolution is excellent, but there is some banding in the sky.

boot verdict

PRICE: $699
COMPANY: Alps Electric
PHONE: 800.825.2577
URL: www.alpsusa.com

H/W

DVBK-1000 Still Image Capture Card

Capture rapture

Still cameras and video cameras both record moments in time, but the latter can record 30 moments every second. You need still images for print or web publishing, but catching the *perfect* moment with a still camera requires talent and a healthy dose of luck. With a high-speed FireWire interface, Sony's DVBK-1000 card delivers the best of both worlds by capturing still frames from digital video tape.

The DVBK-1000's software interface includes myriad features, including zoom, file manipulation, and even on-screen camcorder control.

Shoot up to two hours of video using Sony's DCR-VX700 digital HandyCam—the only camcorder currently equipped with a FireWire output—plug the camera into the DVBK-1000 ISA card, and you'll have thousands of images to choose from. The idea isn't terribly new—Play's $179 Snappy accomplishes the same task with analog video cameras—but the DVBK-1000/DCR-VX700 combo does it all in the digital domain. The payoff is in the quality of the captured images.

The capture software controls the camera's LANC port to control its transport mechanism and displays a streaming preview of the video flowing through the bus. Click the mouse when you see the frame you want and the image is stored to your hard drive. It's as easy as that. All the captured frames are organized into an album, and each frame is stamped with the date and time of capture. You can also set up the software to record a series of images, but each 640x480 resolution image will eat upwards of 900K of storage.

Because each image is recorded at 720x480, the captured images must be down-sampled to 640x480 before you can view them on screen. This can result in image degradation.

Priced at $799, the DVBK-1000 is less than half the cost of an industrial-quality digital still camera. That price advantage evaporates instantly when you factor in the $4,199 cost of Sony's digital HandyCam, but this system can't be beat for flexibility.

— Bryan Del Rizzo

boot verdict

PRICE: $799
COMPANY: Sony Electronics
PHONE: 800.222 7669
URL: www.sony.com

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GT Interactive	79	151	www.gtinteractive.com
Microforum	46	234	www.microforum.com
Microforum	89	231	www.microforum.com
Micron	C2	232	www.mei.micron.com
Micronics	68	236	www.orchid.com
Microsoft	C4	—	www.microsoft.com/games
Microsoft	16	—	www.microsoft.com/games
Microsoft	26	—	www.microsoft.com/games
Microsoft	43	—	www.microsoft.com/games
Microsoft	75	—	www.microsoft.com/games
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PC Gamer	118	—	www.pcgamer.com
Playmates Interactive Entertainment	13	274	www.playmatestoys.com/
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Segasoft	60	—	www.segasoft.com
Syncronys	30	303	www.synchronys.com
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PRODUCT ANNOUNCEMENTS: THEY **TELL** US, WE **PASS** IT ALONG

Book 'em Danno

If you're interested in programming multiuser games for the Internet or producing real-time 3D animation, the Coriolis Group has released two new books that will interest you.

Cutting-Edge Direct 3D Programming provides detailed guidance for every major feature of Microsoft's

Direct3D API, including 3D coordinates, rendering, texture mapping, lighting, and morphing. **Cutting-Edge Java Game Programming** is a guide to creating real-time interactive Internet games.

Coverage includes tutorials about game programming techniques, advanced Java programming, animation, collision detection, and realistic movement. Both books are priced at $39.95 each and include a companion CD-ROM containing demos, code, and shareware.
Coriolis Group: 800.410.0192; ftp.coriolis.com

Chaos Theory

Cause & Effect Productions has just released **3D-PIX**, a gallery of stock 3D

images for graphic professionals. Using the same technology as the motion picture and television industry, C&E claims it has catapulted ordinary image libraries out of the mundane and into a new dimension. At an introductory price of $99, 3D-PIX provides more than 120 fully rendered 3D objects in categories such as business, sports, and science. All images are provided in 72dpi, 150dpi, and 300dpi resolution.
Cause & Effect Productions: 800.962.2998; www.3dpix.com

Program This

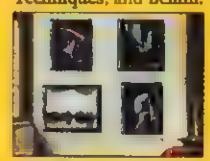
If you're getting lost in the 3D labyrinths, **3D Graphics File Formats: A Programmer's Reference** will become your programming bible. Covering seven of the most commonly used 3D formats including: VRML, RAW, 3D Studio, TrueSpace, AutoCAD DXF, and World Toolkit, the book retails for $39.95 and is accompanied by a CD-ROM containing 3D objects, source code, and file converters.
Addison Wesley Publishing: 800.322.1377; www.aw.com

EEPROMs 4 Sale. Cheap.

If you're running low on your supply of EEPROMs, take heart. Philips Semiconductors has announced aggressive new pricing for its **PCF85xxC-2** family of floating gate electrically erasable programmable read only memories with 2Kbits, 4Kbits, and 8Kbits (256, 512, and 1024 x 8-bit). OEM prices range from $0.38 to $0.77 each in quantities of 50,000. Stock up now. At these prices, supplies won't last long.
Philips Electronics: 800.234.7381; www.philips.com

Art Appreciation Made Easy

Chronicle New Media has just released two fine-art CD-ROMs: **Vermeer: An Exploration of the Artist and His Techniques**, and **Bellini: The Feast of the Gods**.



The Vermeer disc explores the artist's work and times in considerable depth, and includes 21 digitized Vermeer paintings, plus 75 paintings, prints, and drawings from other artists of the period. The Bellini CD-ROM examines Giovanni Bellini's painting "The Feast of the Gods" and also covers the contributions made by Bellini's Renaissance contemporaries Titian and Dosso Dossi. Both titles are available for $39.95 each.
Chronicle Books: 800.722.6657; www.chronbooks.com

Get Mapped, Don't Get Lost

Consult TravRoute Software's **Road Trips Door-to-Door** before you jump in your car and you'll never get lost again. Door-to-Door combines three mapping categories: road atlas, street atlas, and address-to-address to provide precise point-to-point driving directions for the United States, Canada, and Mexico. The disc covers more than 95

million home and business addresses, six million miles of streets, and 630,000 miles of highways, and retails for $49.95.
TravRoute Software: 800.297.8728; www.travroute.com

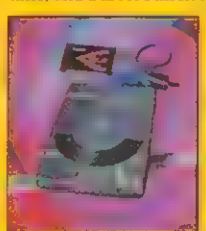
Sit on it

Back pain is the leading cause of disabling work-related injury in the United States and is the number two reason why adults seek medical attention. 3M's **Adjustable Back Support** is an adjustable back rest that has four ways to create a customized fit. The Back Support is constructed from the same thick, contoured, molded foam used for luxury automobile seating and

covered with Nylon fabric that's treated with Scotchgard Fabric Protector for those unsightly spills. The Back Support fits many styles of chair and is both height and shape adjustable for proper lumbar positioning. Two sizes are available: the 19x16x2-inch model priced at $119 and the 19x20x2 incher at $139.
3M Office Ergonomics: 800.332.7483; www.mmm.com/ergonomics

Portable CD-ROM with 3D

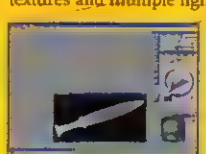
Panasonic has unveiled the industry's first portable, battery-operated 8x CD-ROM drive: the **KXL-783A**. Priced at $499, the drive features a transfer rate of 1200Kbps, 180ms average access time, and a 128K buffer. A pair of



stereo speakers are built into the chassis, as is a Spatializer 3D sound chip. The drive is bundled with a SCSI-2 interface card (PCMCIA Type II format) for easy connection to notebooks. You can also use the drive with a desktop computer equipped with a SCSI-2 host adapter.
Panasonic: 800.742.8086; www.panasonic.com

Funky 3D

Fractal Design has announced **Poser 2**, a $249 3D modeling and rendering application with which you can create an infinite variety of body figures, pose them, and render them with surface textures and multiple lights. These



models can then be incorporated into still or animated scenes. The new edition features animation, new characters, clothing, and props, plus powerful import/export capabilities.
Fractal Design: 800.297.2665; www.fractal.com

Coming Soon: The Swimsuit Edition

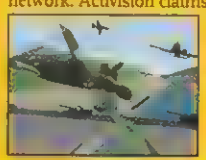
Microleague Multimedia and Sports Illustrated have teamed up to produce two new sport sims—**College Football '97** and **Pro Football '97**. Both games are priced at $39.95 and will feature

accurate statistical simulations, powerful animated graphics, complete statistical printing capability, digitized sound, and play-by-play commentary. Game-players will be able to run plays one at a time or a whole season at once, choose and replace players, change field and weather conditions, select stadiums, and compare teams from different eras.
Microleague Multimedia: 800.334.2722; www.mmi.com

Evasive Maneuvers

Activision has just acquired the world-wide rights from Parsoft to release Win95 versions of **A-10 Cuba**, **A-10 Gulf**, and **A-10 Dogfight**. Let the games begin!

All three games will feature different conflict settings, including Guatonamo Bay, the Persian Gulf, and World War II, and will also offer single and multiplayer combat over a modem or network. Activision claims that A-10



Cuba will feature some of the most advanced flight modeling ever seen, and approximately 16 missions of air-to-air and air-to-ground combat, multiple attack strategies, and progressive levels of difficulty.

A-10 Cuba is presently shipping, with A-10 Gulf and A-10 Dogfight slated to ship in early 1997. Each title retails for $39.95.
Activision: 800.477.3650; www.activision.com

300,000 Pages and I Need 'em Now

If you're finding the local service bureau a little slow these days, then listen up: Sharp Electronics' **AO-4100P** network printer may be the solution you've been waiting for.

The AO-4100P offers multihost connectivity, paper handling, and network management utilities that allow it to be configured and monitored over the network. Sharp claims it'll spit out 40 pages per minute, and boasts it has a 300,000 page-per-month duty cycle—perfect for copying those Dilbert collections floating around the office cubicles.

The powerful dual-processor controller, based on a 33MHz IDT 3081 RISC processor and a Motorola communications processor, is designed to serve users simultaneously. The AO-4100P is available now for only $27,995.
Sharp Electronics: 800.237.4277; www.sharp-usa.com

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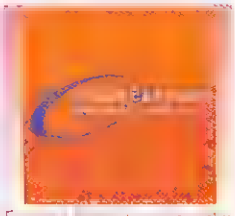

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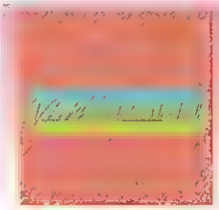

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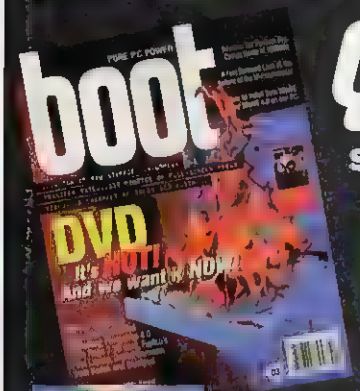

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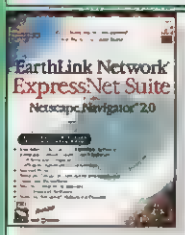

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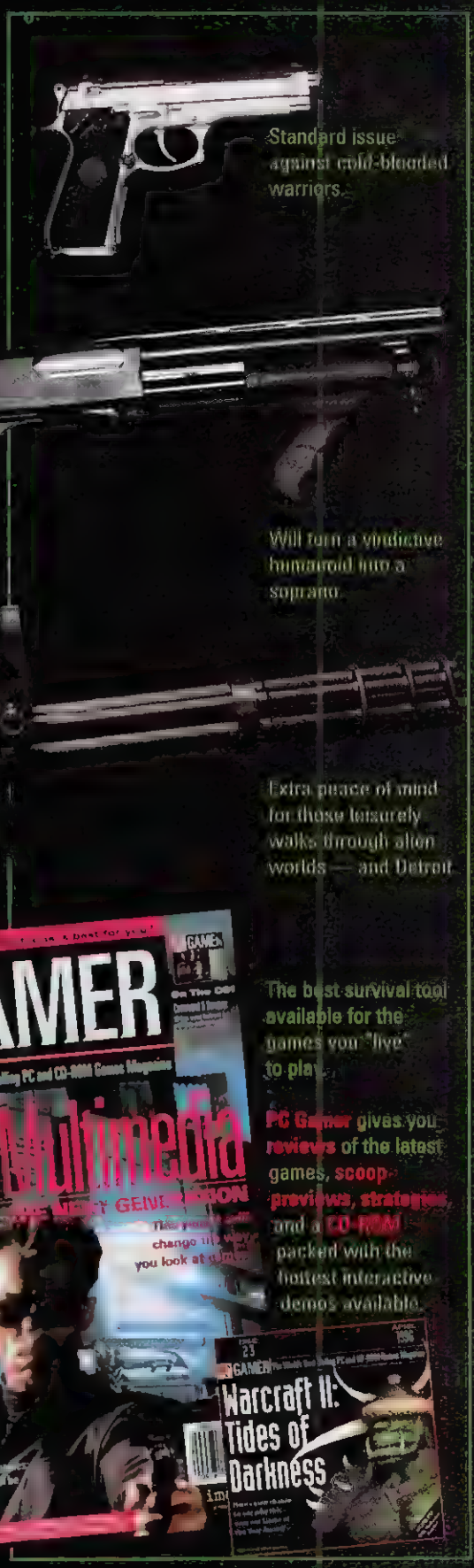

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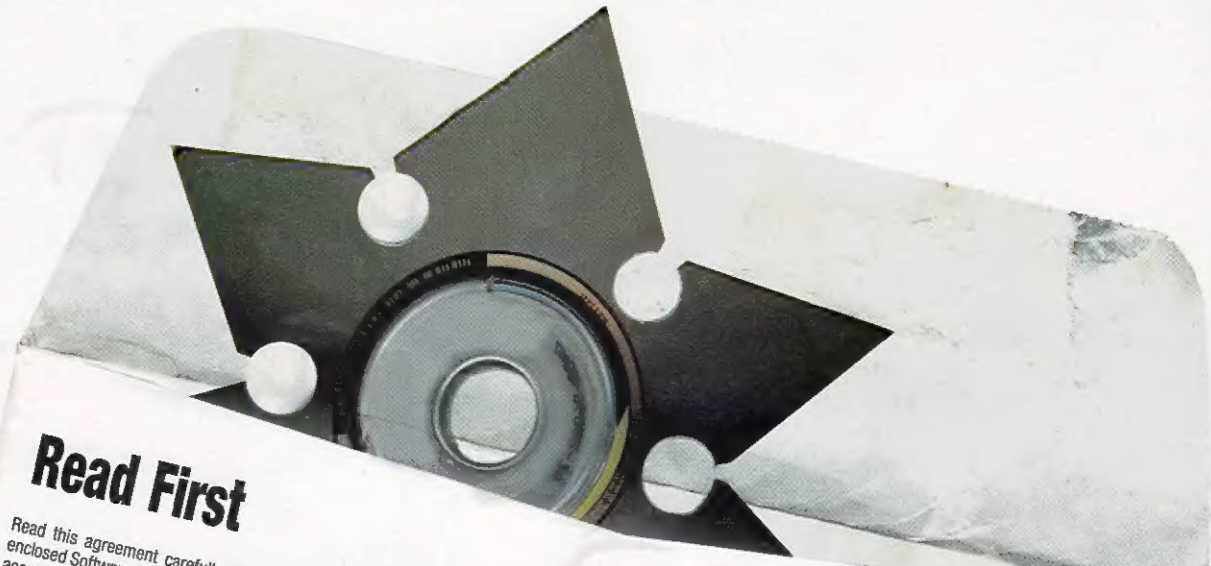

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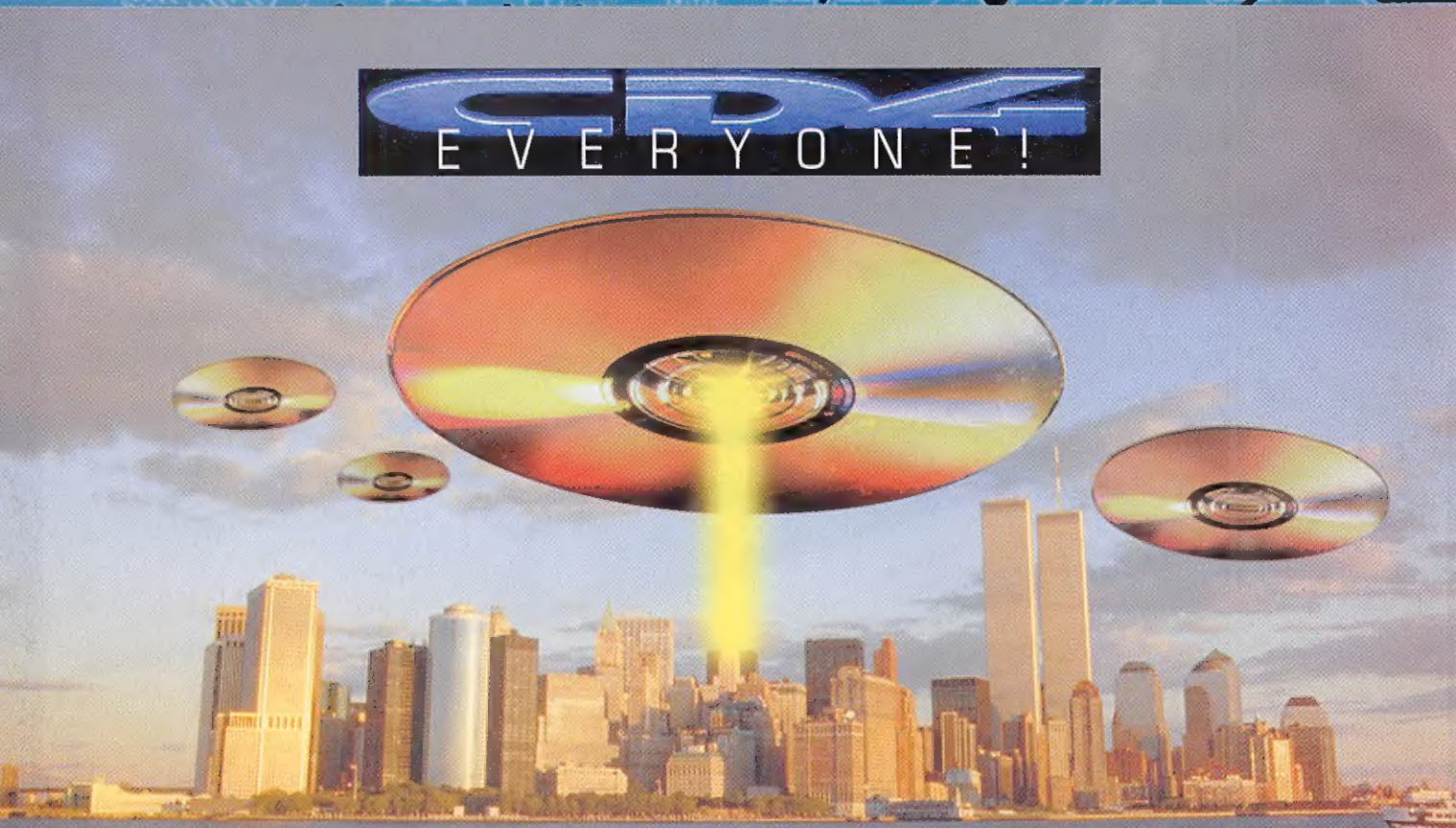

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